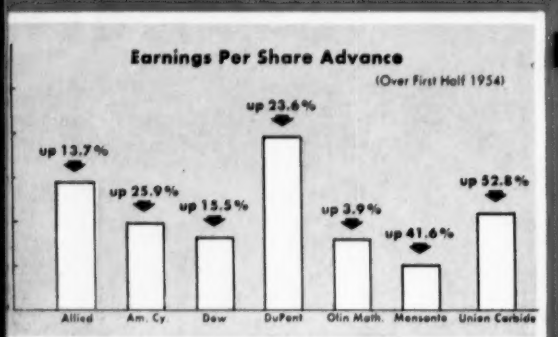
Chemical Week

October 1, 1955 Price 35 cents



BYRNES CHI TO NY OFFICE 9/26 9:02 AM
HAVE CHECKED ALL PERTINENT FIRMS IN
AREA FOR INFO ON ATOMIC REACTOR HEAT
FOR PROCESS USE. NOBODY WANTS TO B
QUOTED BUT HERE'S STORY AS I PIECE
IT TOGETHER: U MIGHT THINK ALL THE

Earnings per 'blue-chip' share show healthy rise . . . . . p. 27

Building a plant abroad poses plenty of problems, but rewards can compensate . . . . . p. 50

Acrylonitrile capacity jumps eightfold in four years; is it too much too soon? . . . . . p. 69

Soon nuclear fission may provide process heat; chemical firms are probing potentialities . . . . p. 75

Briefing salesmen is only part of the job of introducing a line of agricultural chemicals; here's a case in point . . . . . p. 88

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LEADING FORMULATORS of both nitrocellulose and vinyl lacquers prefer Shell Chemical "Quality Group" solvents because no others offer so many genuine advantages.

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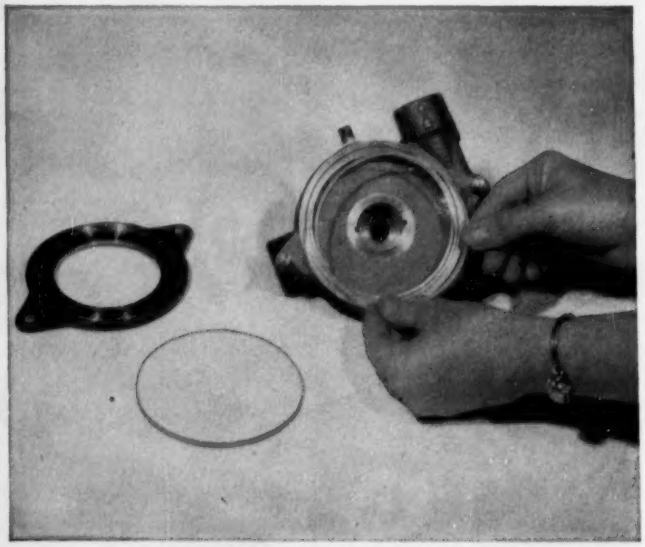

Advanced mechanical features of the Eco Centri-Chem pump allow easy, fast disassembly. Pump lines can be backwashed rapidly . . . with all slurry and filter aid expelled through open front.

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THE IMPELLER and housing cover of the pump on the portable filter, above, are made from 29% nickel –20% chromium-copper-molybdenum cast stainless steel (Alloy Casting Institute type CN-7M).

This stainless nickel containing alloy resists hot sulfuric acids in all concentrations to 150°F, and in 10% solutions to 200°F.

It resists a long list of other severe corrosives . . . including hot concentrated solutions of acid chlorides and sulfates, plating solutions, dilute hypochlorites, paper mill liquors and organic fluids.

Pumps, valves and other flow restricting devices create a turbulence that accelerates attack by the corrosive fluids handled. That's where you need highly alloyed nickel containing stainless to keep output up as well as to minimize maintenance.

Field experience in solving corrosion problems is one of Inco's most valuable assets. And it's available to you for the asking. Whatever your metal difficulty, send us details for our suggestions. Write for List A of available publications. It includes a simple form that makes it easy for you to outline your problem.

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Chemical Week

October 1, 1955
Vol. 77, No. 14

TOP OF THE WEEK

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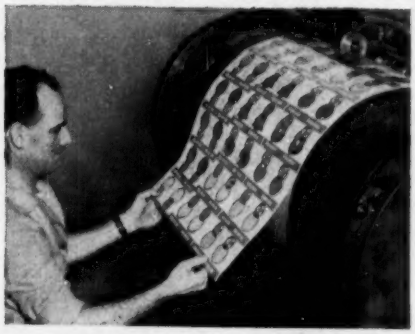
INTRODUCING... *Versamid*

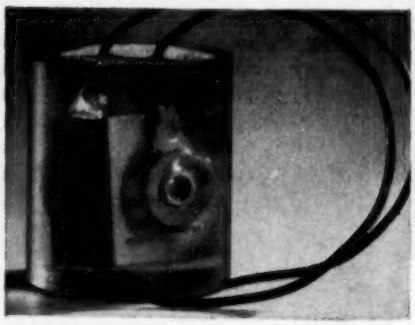
GENERAL MILLS TRADE NAME FOR VERSATILE POLYAMIDE RESIN

General Mills polyamide resins have become so popular in industrial uses, they need and deserve a name of their own. So, General Mills has adopted the trade name "Versamid" for its polyamide resin. The extreme versatility of these resins amazes nearly everyone. You'll appreciate why when you try them yourself. On the next page, you will find brief descriptions and some of the uses for General Mills line of Versamids. For more information, use the coupon lower right.

HOW TO USE *Versamids* FOR PROFITABLE PRODUCTION



Coating paper posters or labels with Versamid, as above, results in a non-blocking film that proves a strong barrier against moisture-vapor penetration.



Tough, bubble-free Versamid-epoxy blends work wonders for electrical embedments, above. They have negligible shrinkage and high dielectric strength. Other special features are low exotherm, long pot life, excellent thermal shock resistance.

Only a few years new, Versamids already have won a big place for themselves in industry. For here are safe, easy-to-use resins that appeal to everyone in the plant—from workmen to formulators. Ask yourself if you can't use these outstanding features:

Versamids require no toxic, volatile or explosive curing agents, even when blended with epoxy resins for special properties. Nor are any volatile reaction products produced during curing. Also, we know of no cases of toxicity or dermatitis caused by Versamids.

They're compatible, too—with each other and with a large number of modifying agents. This allows them to fit your needs exactly. You can blend Versamids to control resin hardness, flexibility, gloss, melting point, heat-sealing temperatures and range, tackiness, and other properties. To extend their versatility further, you can get some Versamids uncompounded (to add plasticizers, waxes, modifying resins) or compounded (for other special properties).

Versamids have sharp melting points. Thus, they heat seal easily, set up quickly without blocking. They resist grease and oil, moisture, wax emulsions, anti-freeze, detergents, alkalis, mild acids, and many solvents and common corrosive chemicals. They may be held at high temperatures for long periods without harm, and are stable for long-term storage.

THERMOPLASTIC USES—Versamids are popular because they meet the needs of a remarkable range of uses. In thermoplastic form, they prove ideal for inks, packaging, overprint varnishes, paints . . . plus flexible adhesives or coatings for paper labels, metal foil, plastic bottles, leather goods, publication covers, and many more—often replacing expensive laminations.

THERMOSETTING USES—When blended with epoxy resin, the Versamid blends are thermosetting and exhibit a whole new range of valuable properties. They're tough and economical, have great adhesion, and resist many corrosive chemicals. They offer low exotherm, high dielectric strength, good heat and color stability, and show a longer pot life than an equivalent mass of monomeric amine-cured resins. As Versamid blends cure quickly, amber clear and relatively bubble free, they improve performance characteristics of glass laminates, pottings and castings, plastic tools and dies, to name but a few.

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B-150

OPINION....

There's a Difference

You may have already noticed that there's a difference in this issue of CHEMICAL WEEK.

Two new regular features—Charting Business, and Technology Newsletter—have been added. They, together with the redesigned Newsletter (now Business Newsletter) and Market Letter (now Market Newsletter) appear on special, fast-printing gray paper.

Our Business & Industry editors, who gather, interpret and write the contents of the Business Newsletter, have also undertaken to prepare the easy-to-read charts and graphs of significant business data.

Our Research and Production editors are collaborating to apprise you in their letter of the meaningful developments and trends in technology.

Our Markets editors will continue, of course, to analyze and report—briefly and pointedly in the Market Newsletter—the shifting currents of supply, demand and prices of basic commodities.

Yes, there's a difference in *CW*—a difference designed to speed the week's consequential news to you.

W. Alec Jordan—*Editor*

Sizing Up 1957

TO THE EDITOR: We read your market discussion on pentaerythritol (PE Capacity: Running Wild? *Sept. 10, p. 93*) with considerable interest, but find ourselves somewhat at variance with your conclusions.

Several considerations combine to make us feel that the picture will not be as black as you have painted it.

1. Our own estimates put total 1955

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N. Y.

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If you are contemplating investment in new processing facilities, or are seeking better returns from your existing plant, our consulting experience may be helpful to you.

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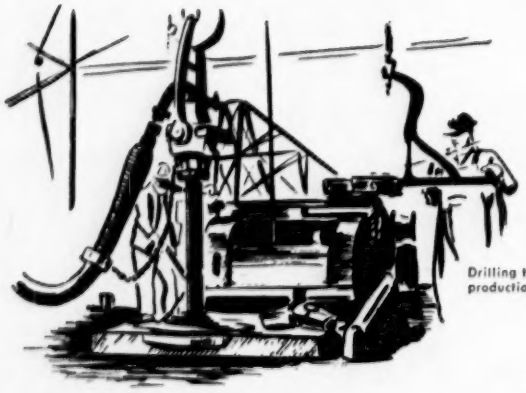

Drilling the production wells

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- **WORLAND, WYOMING**

PE capacity somewhat below your 78-million-lb. figure.

2. We know at first hand that construction is well under way on our own 24-million-lb. new plant in the Midwest (at Louisiana, Mo.), and you mention that Trojan's expansion is near completion. But, to the best of our knowledge, work has not yet been started on any of the other expansion projects you describe. Until these expansions are actually under way, it is not possible to set a figure for 1957 capacity much over 110 million lbs.

3. We have long felt our responsibility to see that users of PE are not faced with even temporary shortages. We believe that whatever expansion we make must be in substantial volume in order to achieve those production economies and favorable costs needed to insure PE's continued growth on the basis of its technical merit, regardless of competing polyols.

4. We believe that the industry cannot expect to operate consistently at much over 85% of rated capacity because of fluctuation in demand, and interruptions caused by maintenance shutdowns and vacations. Your estimates of 1955 production work out to about 83% of your capacity estimate. Your figures for 1956 would indicate 87% utilization of capacity. Both of these, to our way of thinking, indicate that supply and demand will be fairly well balanced. We agree with your conclusions that things could be out of balance in 1957 (your estimates work out to 64% utilization of projected capacity in that year), but this would increase to around 80% if projects presently announced but not yet under way are delayed.

5. We differ with your conclusion that PE has reached its maximum utility in alkyds. Data from Tariff Commission Reports show that alkyd resin production has increased 102% in the past eight years (1946 to 1954); for the same period we have estimated . . . that consumption of PE in alkyds has increased over 800%. Yet, only 47% of all the alkyds made in 1954 contained PE. We believe that broader utilization of PE can be expected in the future because of technical and economic considerations. (For instance, increased availability of low-cost tall oil fatty acids will almost inevitably require more PE. Also, use

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ADM's new lauryl fatty alcohols are derived from vegetable oils and fats. ADOLS 10, 11, 12, 13, 14 and 15 are all fractionated to definite composition and are furnished in uniform and consistent specifications and composition as to chain length. These are all water white, noncorrosive, oily liquids possessing a mild fatty odor. They range from 50% to 90% pure C_{12} lauryl alcohol depending on grade.

ADOL lauryl alcohols are among many new saturated and unsaturated fatty alcohols being produced in tank-car and LCL quantities at ADM's ultra-modern Ashtabula, O., plant. Others are: cetyl, stearyl, cetyl-stearyl, arachidyl-behenyl, hydroxy stearyl, stearyl oleyl, oleyl, behenyl, linoleyl, linolenyl, arachidonyl-clupanodonyl, erucyl and ricinoleyl. None of these ADM Chemifats is consumed by ADM; the entire plant output is for sale to industry.

Here is something to work with . . . new fatty alcohols of improved properties, higher purity. Write on your letterhead for samples and advanced technical bulletins.

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Unguentine
the First thought in burns and skinjuries
improved · softer · washes stain-free
Unguentine
the First thought in burns and skinjuries

"Unguentine," famous remedy for burns and skin injuries, manufactured by Norwich Pharmacal Company, is made washable by incorporation of Span 60 and Tween 60.

Forward-looking formulators of medicated ointments can frequently add new advantages in cosmetic acceptability to their products through the use of Atlas emulsifiers. For example, these ointments can be formulated in such a way that they can be removed easily from clothing or bedclothing by washing, thus eliminating objectionable staining. The ointment also becomes easier to remove from tender or irritated skin.

The Tween® emulsifiers made by Atlas are especially useful for this purpose, being the same type of emulsifiers often used to make vitamin oils, flavor oils and perfume oils "soluble" or miscible in water. These emulsifiers are *hydrophilic;* that is, they have an affinity for water.

In general, there are two types of ointment, either of which can be made washable through proper incorporation of a Tween emulsifier. One is the melt type, usually consisting of such ingredients as waxes, oils, petrolatum, lanolin and medicaments, which are melted together to form the ointment. The other is the emulsion type of product, in which the oils, waxes and medication ingredients are emulsified in water.

In the formulation of a washable melt-type ointment, one of the Span® emulsifiers is sometimes used with the Tween emulsifier to assist in blending the Tween into the melt. The Span emulsifiers are *lipophilic;* that is, they have a greater affinity for oils and waxes than for water, and they thus complement and assist the Tween materials.

To make a washable emulsion-type of ointment, a Span-Tween emulsifier blend is used in such a way as to form an oil-in-water (as contrasted with a water-in-oil) emulsion. The Tween emulsifier predominates in the emulsifier blend, while the Span assists in making the emulsion more stable against separation of ingredients in storage.

ATPET® 931 helps cure ailing oil wells

Water is a common enemy of oil wells, both new and old. To cure water problems in oil production, many service companies are now using ATPET 931, an interfacial tension depressant developed by Atlas.

When ATPET 931 is injected into oil-bearing sand into which water has infiltrated, it breaks down the natural barrier between water and oil . . . and allows oil to flow once more.

Oil producers are using this simple, inexpensive treatment for restoring the productivity of water-blocked wells. They also find it valuable in the completion of new wells to prevent water blocks that could result from drilling muds. ATPET 931 is being used with other stimulating techniques, such as acidizing and fracturing, as an assistant to remove water or acids employed in the process.

If you'd like further technical facts on ATPET 931, just write for a copy of our latest publication on this subject.

ATLOX® emulsifiers... favorite of weed-killer manufacturers

From dandelion to mesquite, weeds take a beating today from the army of chemical herbicides. Atlas is happy to have a part in this. Our connection is that we produce the large and versatile line of ATLOX emulsifiers for use in making emulsifiable concentrates of 2,4-D and 2,4,5-T weed-killers, and in formulating other types of agricultural pesticide products. The purpose of these emulsifiers is to make toxicant-solvent mixtures easily and quickly dispersible in water for effective application.

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ATLAS

ATLAS

CHEMICALS DIVISION
ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE
ATLAS POWDER COMPANY, CANADA, LTD., BRANTFORD, CANADA

The chemical way to tame static electricity

Compounders of chemical specialties are now making antistatic sprays, wiping cloths, polishes and other products that help eliminate the age-old nuisance of static "shocks." The basic ingredient of these antistatic products is a surface active agent, related to emulsifiers and detergents, in which Atlas has pioneered for over fifteen years.

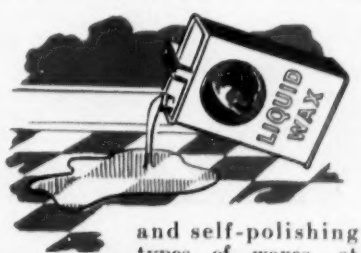
The problem of static electricity has been made more acute with the advent of man-made fibers and plastics. Garments may cling to the body because of it—or you may receive a shock after sliding across your auto seat cover, or after walking across a rug or plastic floor covering. Plastic articles attract dust and lint because of it. It is an expensive nuisance in mills where fibers are processed into fabrics.

Here are some of the many ways in which Atlas surface active materials are being used as antistatic agents.

In Dry Cleaning, a small amount of antistatic chemical in the cleaning soap proves helpful to the customer as well as to the dry cleaner. The garments do not cling to the body and do not attract soil. At the same time, the antistatic agent helps to prevent pick-up of lint and soil by the garment during cleaning. The cleaner doesn't have to waste time separating dark clothes from those which might produce lint. The dry cleaner gets another "bonus," for the antistatic material aids in the cleaning action.

Cationic materials like Atlas G-3780 are effective in this application. The antistatic material is introduced into the bath in combination with a dry cleaning detergent such as Atlas G-2684, compounded into special dry cleaning soaps. Concentrations of as little as 0.1% are adequate for static control.

For Floor Polishes, several Atlas chemicals show promise in eliminating static charges on plastic floor coverings. Incorporated into liquid



and self-polishing types of waxes, at levels of about 1% of total solids, these materials substantially reduce the tendency of linoleum and other surfaces to attract dust and generate static.

Home Laundering of synthetic fabrics can render these materials static-free when a little antistatic agent is added to the last rinse. 1 to 2% of TWEEN® 20 does the job. For greater permanence, a compound such as Atlas G-3780 is recommended. Either of these chemicals

is readily made up in water solution and can be suitably perfumed for the application.

Further details and trial samples of Atlas products are available to companies interested in the manufacture and sale of antistatic specialties.

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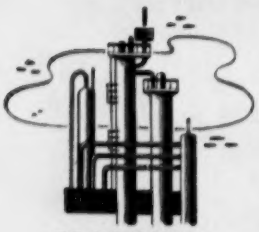
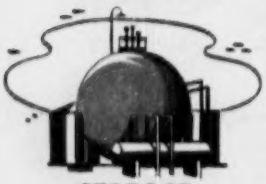


PROCESSING



STORAGE

TRANSPORTATION

● Whenever there's the slightest evidence of corrosion, there's the beginning of future losses . . . down-time, equipment and *customers*.

Even before this menace appears, ARco Engineers and ARco Anti-Corrosion Rubber Protective Coatings should be considered . . . for the long term savings they will deliver for a reasonable initial cost.

Regardless of your location . . . ARco Engineers will design, fabricate, insulate, and erect complete ventilation, storage, and processing installations . . . or, work with your equipment supplier in corrosion-proofing your systems.

Yes, due consideration to the problem of corrosion will produce the only logical answer . . . ARco engineering know-how and ARco Protective Coatings!

ARco FIELD SERVICE UNITS

ARco Field Service Engineers bring complete technical know-how and facilities right into your plant. Permanent installations or equipment too large to move can be fabricated and covered right on the job by our Field Service Units.

ARco

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Automotive Rubber Company, Inc.

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ARco Rubber Processors

4033 HOMESTEAD ROAD • HOUSTON, TEXAS

OPINION . . . . . .

of PE with glycol for economy and control of functionality is continuing to increase. Only 1 million lbs. of PE-glycol alkyds were made in 1946, while the Tariff Commission Report shows that 45 million lbs. based on this one blend were produced in 1954.)

6. We expect requirements for PE in our own newer developments (PE-based plasticizers and others) to continue to grow in the same way that our requirements have increased with the growth in sales of our earlier developments (the Pentalyns, the Cellolyns).

7. As you point out, we do not expect to begin operation of our new Midwest plant at capacity rates when it starts up late next year. But neither do we expect that "glut" of PE that you forecast. We believe that consumption will grow in an orderly and predictable fashion, and that capacity will come in at a rate that will enable us to stay comfortably ahead of demand, and provide an insurance "cushion" to encourage further growth in use.

To your final quotation that "Anyone thinking about joining the PE parade must be crazy," we can only reply, as many before us have, "You don't have to be crazy to be in this business, but it sure helps!" . . .

J. W. L. MONKMAN
Director of Sales
Hercules Powder Co.
Wilmington, Del.

CW appreciates those producer opinions. We did point out, of course, that many of the cited expansion projects were being held on a wait-and-see basis, that greater usage was anticipated in alkyds and specialty compounds. Unfortunately, just which prediction is closer to reality can't be settled until 1957.—ED.

DATES AHEAD . . .

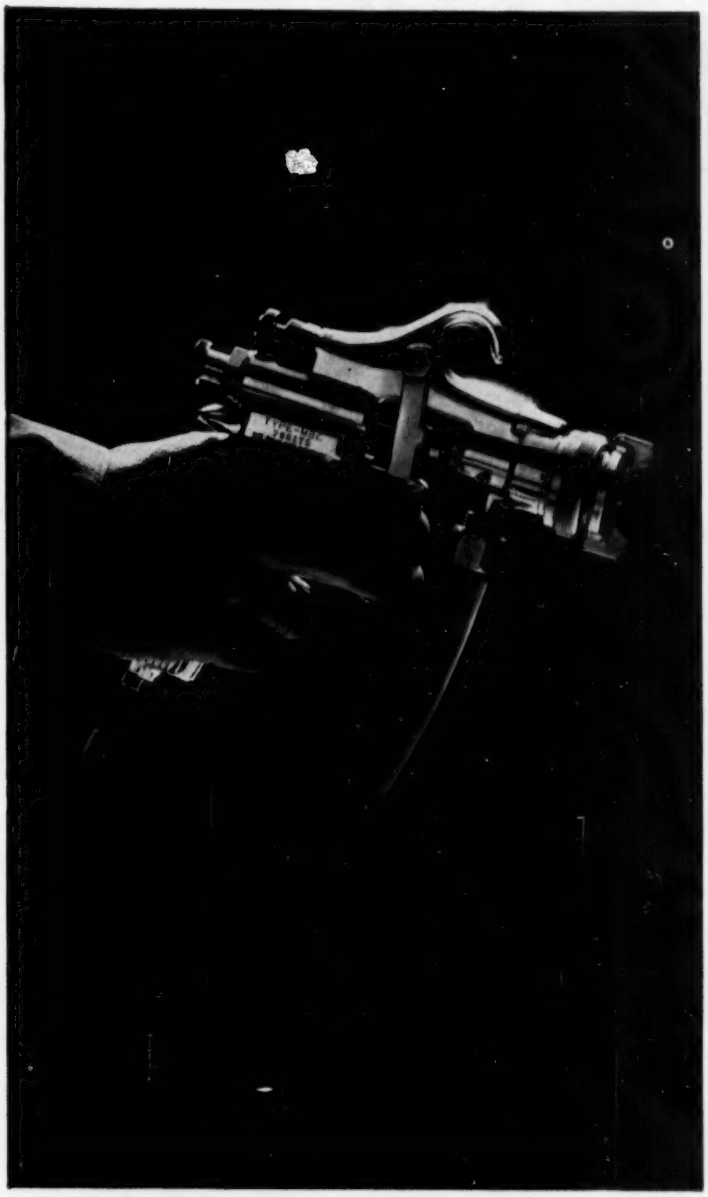
Federation of Paint and Varnish Production Clubs, and **Paint Industries' Show,** Statler Hotel, New York, Oct. 3-5.

World Plastics Fair and Trade Exposition, National Guard Armory, Los Angeles, Oct. 5-9.

"Plastics 1955" Trade Fair and Production Exhibition, Dusseldorf, Germany, Oct. 8-16.

National Paint, Varnish and Lacquer Assn., annual convention, Shoreham and Sheraton-Park Hotels, Washington, D.C., Oct. 31-Nov. 2.

for the paint, varnish and lacquer industry



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acetone
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Tecsol® (95% proprietary solvent)

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FILM FORMERS

cellulose acetate
cellulose acetate butyrate

Stocks of most of these Eastman chemicals are carried in the larger industrial centers of the United States. For further information, write or call our nearest sales office.

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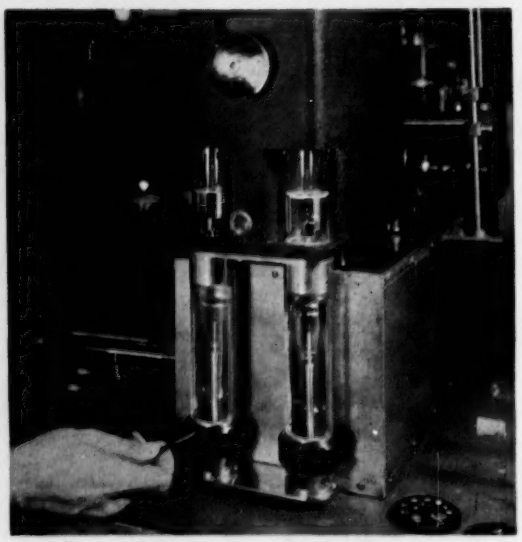
KINGSPORT, TENNESSEE
Subsidiary of EASTMAN KODAK COMPANY

SALES OFFICES: **Eastman Chemical Products, Inc.,** Kingsport, Tennessee; New York—260 Madison Ave.; Framingham, Mass.—65 Concord Street; Cleveland—Terminal Tower Bldg.; Cincinnati—Carew Tower; Chicago—360 N. Michigan Ave.; St. Louis—Continental Bldg.; Houston—412 Main St. **West Coast: Wilson Meyer Co.,** San Francisco—333 Montgomery St.; Los Angeles—4800 District Blvd.; Portland—520 S. W. Sixth Ave.; Salt Lake City—73 S. Main St.; Seattle—821 Second Ave.

Life ...on the Chemical Newsfront

MORE MEAT, FINER HIDES and better wool come from livestock free of debilitating parasites. Highly efficient control of animal parasites has been secured with a diphenylamine derivative, phenothiazine, the most effective vermifuge known. Diphenylamine, recently added to Cyanamid's line of intermediates, is the basic ingredient in the synthesis of this important veterinary drug. However, uses for diphenylamine do not stop here. It is used in the manufacture of rubber antioxidants, smokeless powder, and dyes for paper and textiles.
(Organic Chemicals Division)



FIRST GARNER HEAVY-DUTY QUARTZ FIBER MICROBALANCE, produced in collaboration with Cyanamid's microchemical staff, permits 100 times more load than previously, but retains accuracy to one-billionth gram. Extreme accuracy, and efficient chemical and process controls in making AERO® Metallic Stearates assure Cyanamid's customers consistent products with uniform physical properties. Typical Analysis Sheets on AERO Metallic Stearates are available.
(Industrial Chemicals Division, Department C)

NOW PAPER IS REPLACING WOOD for sealing in bulk shipments of grain, malt and chemicals. Standard practice since the 1880's had been to nail up boxcar doorways with expensive laminated wood "grain-doors." A. J. Gerrard & Company of Illinois hit upon the idea of a lightweight, inexpensive barricade made of glass fiber reinforced paper. The idea was sound, but experience showed that still greater strength, particularly wet strength, was needed. So Gerrard tried MELOSTRENGTH® Paper. Results were spectacular. Dry strength increased 30%, wet strength shot up 400%, making these barricades eminently practical for withstanding the thrust of heavy loads, even if soaked by seeping rain. Required to stand up under 9,000 pounds pressure, the barricades now resist 36,000 pound loads. Lightweight MELOSTRENGTH Paper barricades are easy to handle and install, weighing only a fraction of the wood they replace. Because of their low cost, they are expendable. With the high wet and dry strength imparted by MELOSTRENGTH® Resin, paper is finding many such new uses. (Industrial Chemicals Division, Department C) *Trade-mark

Two-part die placed in press—ready to use without time-consuming scraping and finishing.

"SETTING-UP" EXERCISE

New amines mean faster cure for epoxies

New time and labor savers are now cast from epoxy resins. Epoxy dies, like the drop-hammer die illustrated, can often be made in hours, instead of the usual days to weeks of work required by previous materials. Dies are made by Teicher Manufacturing Co., Flushing, N. Y., using resins supplied by the Marblette Corp., Long Island City, N. Y. Rapid curing at moderate baking temperatures, or even at room temperature, is secured through proper selection of casting material and curing agent.

For such casting applications, and for adhesives and coatings, Cyanamid has developed four new amines as curing agents: Dimethylaminopropylamine, Diethylaminopropylamine, Dibutylaminopropylamine, and Iminobispropylamine. Fastest cure is obtained with Dimethylaminopropylamine and longer pot life with those having higher substituents. These amines also are valuable intermediates for products such as surface active agents, pharmaceuticals and dyestuffs.

(New Product Development Department)

Top half or punch of drop-hammer die is poured. Epoxy resin with curing agent "sets up" in a few hours.

Blank of aluminum sheet is inserted between punch and die.

Stamped part after being formed by plastic die.

AMERICAN Cyanamid COMPANY

30 Rockefeller Plaza, New York 20, N. Y.

Additional information may be obtained regarding these products by writing on your business letterhead to the Division of American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y., indicated in the captions.

NATURALLY manufacturers take every possible precaution to avoid contamination in making their products. Don't let *your* quality control end there by shipping your product in containers that are not 100% free of scale, grease and dirt. With USS Steel Drums you can maintain product purity right to your customers' door. Here's why:

AFTER each USS Steel Drum has been carefully shaped, formed and welded, a strong alkali bath cuts away all dirt and grease. Next, the interior *and* exterior are completely descaled. This process is followed by saturating all surfaces with a special phosphate solution that retards rusting. These three careful steps are an assurance that your product, shipped in USS Steel Drums, arrives pure . . . always! USS Steel Drums are available in a wide variety of shapes, sizes and finishes . . . plain or decorated.

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U.S.I. CHEMICAL NEWS

October 1 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1955

TWO NEW CHEMICAL PLANTS LOCATE AT ASHTABULA, OHIO

Titanium and Fatty Alcohol Units Join Interrelated Chemical Complex; Local U.S.I. Sodium Source a Factor

The Great Lakes port of Ashtabula in Northeast Ohio is fast becoming one of the important chemical centers of the country. Over the past ten years the towers of half a dozen large process plants have come to dominate the skyline. The presence of U.S.I.'s metallic sodium plant at Ashtabula has catalyzed the growth of this new production area.

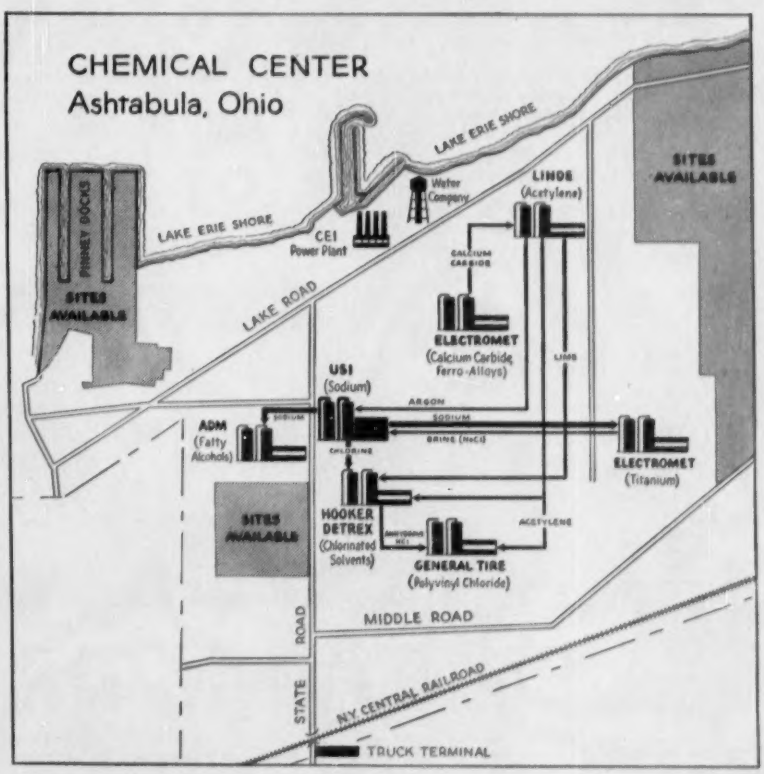
The chemical units relate, one to the other, in many ways. Products and by-products of one installation feed the process streams of the others. One plant's by-product material is another's source of supply.

Latest additions to the Ashtabula complex are Archer-Daniels-Midland's new fatty alcohol plant, and a new 7500-ton per year titanium plant now being built by Union Carbide's Electromet Division. They tie in with existing units in this manner:

Archer-Daniels-Midland's plant, which went onstream in June, uses U.S.I. sodium for reduction of fats and oils to saturated and unsaturated C_8 to C_{22} fatty alcohols, many of which have never been available before in commercial quantities. By-product caustic will be sold to chemical plants and other industry in the Northeast Ohio area. The availability of plentiful sodium from U.S.I. figured heavily in ADM's initial plans for entering the fatty alcohol business, and locating in Ashtabula.

The U.S.I. sodium plant will supply metallic sodium to Electromet for reaction with titanium tetrachloride to produce titanium metal. Sodium chloride (brine) will be a by-product. The brine will be returned to U.S.I. for production of chlorine and more sodium. Due to rigorous specifications on titanium raw material purity, U.S.I. will use an atmosphere of pure argon in the sodium refining process, resulting in sodium of a purity not previously available commercially. The argon

MORE



U.S.I. Offers 3 Series of Polyethylene Resins

U.S.I. polyethylene grade numbers have been realigned into three well-defined groups. Resins in the 100, 200 and 300 series are available from the plant at Tuscola, Ill. and from warehouse points at Anaheim, Cal.; Chicago, Ill.; Cincinnati, O.; Jersey City, N. J. and New Orleans, La. They are:

PETROTHENE* 100—*Tubular film extrusion* resin having good transparency; medium flow, for *blow molding.*

PETROTHENE 110 — *Tubular and sheet film extrusion* resin having good transparency; superior slip properties; medium flow.

PETROTHENE 200 — All purpose resin for general *molding and extrusion, film,* or *small parts.*

PETROTHENE 201 — Medium to High flow resin for *molding, extrusion, paper coating, blow molding.*

PETROTHENE 202 — *High flow resin* for *injection molding, large parts, coating applications.*

PETROTHENE 203 — Medium to High flow resin for *injection molding* and *paper coating.* Stiffer than "202" in molded part.

PETROTHENE 210 — *Sheet film extrusion resin* (Type 200) having good transparency; exhibiting superior slip properties.

The Petrothene 300 series is especially adapted to wire covering and electrical insulation applications.

Samples and property data on request.

*Trade Mark

Chemical PA's Discuss Purchase vs. Manufacture

Seven considerations in buying versus making custom chemicals were discussed at the June meeting of the Chemicals and Allied Products Buyers Group of the National Association of Purchasing Agents. D. B. Black, sales manager for fine chemicals at Dow, and the principal speaker, enlarged on the considerations of production set-up, equipment, time factors, man power, risks and capital.

Officers of the group, elected at the meeting, include: G. C. Fordyce (American Cyanamid) — General Chairman; S. E. Spencer, Jr. (William S. Merrell) — General Vice Chairman; R. G. Weigel (Eli Lilly) — Chairman, Pharmaceuticals and Fine Chemicals Section; J. W. McKinney (DuPont) — Chairman, Heavy and Industrial Chemicals Section; A. T. Ericson (Lederle) — Secretary; J. M. McNeil (Goodrich) — Treasurer.

January 24, in Chicago and January 31 in New York have been fixed as the dates for the next midyear meeting of the group.

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October 1 ★ **U.S.I. CHEMICAL NEWS** ★ 1955

Seawolf Launched — Sodium Vital to Her Atomic Power Plant

Courtesy of General Dynamics

On July 21 the second U.S. atomic submarine Seawolf slipped down the ways into the Thames River at Groton, Conn. The first atomic submarine Nautilus had preceded her by 6 months, but there is more than a time difference between the two vessels. Their nuclear power plants differ. While water was used as the coolant in the Nautilus, liquid sodium performs this function in the Seawolf. The coolant (in effect) transfers the heat generated by atomic fission within the reactor to the boiler, which turns it into steam for the turbine. On the advantages of the sodium system, we quote from the *New York Times* of Friday, July 22:

"General Electric — which built the Seawolf reactor — claimed these advantages for sodium:

"Because sodium does not boil, except at extremely high temperatures, the reactor coolant system does not have to be pressurized.

"Sodium is an excellent conductor of heat.

"Sodium, when its oxygen content is low, is noncorrosive to steels at operating temperatures.

"Sodium is a good electrical conductor; because of this it can be circulated by a magnetic pump that has no moving parts.

"Intermediate spectrum neutrons place fewer restrictions on the structural materials that can be used in the reactor core. For example, stainless steel can be used. This is because high energy neutrons are not readily absorbed by conventional metals."

Use of sodium as a heat transfer medium in atomic reactors takes advantage of sodium's *physical properties*. Most applications among U.S.I.'s sodium customers utilize the *chemical activity* of sodium.

Methionine Protects Against Irradiation

Recent reports from several researchers working independently in the United States and abroad have demonstrated the ability of methionine to protect against irradiation injuries. In the experiments, X-rays were used as the irradiation source and various laboratory animals were tested. The test animals were fed methionine prior to the exposure. Even under massive doses of irradiation the test animals remained relatively unharmed. On the other hand, the control animals showed skin lesions, some mortality and other typical evidences of irradiation damage.

This protective effect of methionine may be related to its previously reported ability to speed restoration of damaged tissue following burns, wounds and related skin injuries.

CONTINUED ASHTABULA

will be supplied by the Ashtabula plant of Linde Air Products Company, another Division of Union Carbide.

Location Advantages

The two new plants share with U.S.I. and other chemical enterprises in the area advantages of abundant water, land, labor and electric power. Easily available raw materials and markets plus transportation facilities by road, rail and water, have been important factors in the expansion of Ashtabula's chemical family.

In addition, the St. Lawrence Seaway, when completed, will add to the breadth of markets and greatly increase the number of raw materials easily and economically accessible to the area. In anticipation of the Seaway's coming, Ashtabula is increasing dock area by 40%, and expects to increase the harbor depth to 25 feet.

In every direction U.S.I. and its Ashtabula neighbors are preparing for a busy time to come on "Lake Erie's Chemical Shore."

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

A new silicone rubber remains flexible at 600°F for 150 hours or longer. Other characteristic properties are unaffected. Suggested for kitchen oven door seals and parts for hot materials handling equipment in industry. **(No. 1110)**

A new melamine-type resin for the paper trade bolsters tensile and wet burst strength. It also improves dry Mullen, wax pick, freedom from lint, dry stiffness, wet rub resistance, internal sizing and folding endurance. **(No. 1111)**

Simple new formula for estimating methionine requirements in broiler rations, plus wall chart giving methionine content and energy levels of common feedstuffs, are now available to feed manufacturers. **(No. 1112)**

An improved method for water-free hydrazine by azeotropic distillation has been described. The process yields anhydrous material directly, avoiding the costly two-step process necessary in previous conventional methods. **(No. 1113)**

A new, nonfoaming wetting and rewetting agent has been developed for exceptionally high speed dyeing and finishing of cottons, rayons and synthetics — where foam interferes. Very low concentrations are recommended. **(No. 1114)**

A versatile new small-scale Dissolver with stainless steel shaft and impeller is especially designed to speed work in labs, pilot plants and small batch production. Gives 2 to 20 times the speed of conventional machines. **(No. 1115)**

A chemically-resistant filter felt made of tightly compacted Dynel fibers bonded with Vinyon has been developed for pressure filters and centrifuges. It is easy to clean, does not shrink. Maximum temperature is 170°F. **(No. 1116)**

A new polyglycol ether removes neoprene protective coatings from aircraft Radomes in less than two hours. Applied as a paste and allowed to stand, the ether reduces to one half a man hour what was once an 8-hour job. **(No. 1117)**

Oxidation of hot solder can now be prevented in continuous operations where the solder is kept molten in the pot. A synthetic wax, put over the top, melts to form a continuous protective coating. The wax also aids fluxing. **(No. 1118)**

A new plastisol gives outstanding adhesion to black iron, steel, galvanized and other metal surfaces, without primers. Used for caulking sewer and drainage pipes, and for drum linings where acid and alkali resistance is essential. **(No. 1119)**

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DETROIT 16, MICH.
1448 Wabash Avenue

HOUSTON, TEXAS
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903 McGee Street

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PHILADELPHIA 9, PA.
123 South Broad Street

PITTSBURGH 16, PA.
246 Washington Road

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2750 N. W. 31st St.

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Division of National Distillers Products Corporation

99 PARK AVENUE, NEW YORK 16, N. Y.

Business
Newsletter

CHEMICAL WEEK
OCT. 1, 1955

Chemical firms—both large and small—are up in arms this week over developments that, they say, will slow their expansion pace.

After hanging on tenterhooks for more than a month, major companies (chiefly the aluminum-producing concerns) now have the word that tax concessions will be unavailable. Others (e.g., glycerine producers) still stand a chance of reprieve—but for the most part, rapid amortization is a thing of the past.

Result: a number of companies, with large expansions hanging in the balance, are revising their plans. They won't cancel scheduled expansion, but will spread spending out over a longer period.

Small firms—especially uranium entrepreneurs—have another complaint: proposed Securities Exchange Commission regulations aimed at tightening controls over small security offerings will, they say, tend to discourage small businesses from starting. If SEC's rule changes go through, no small firm could get financing without first making a substantial down payment to its underwriter—a down payment it might ill afford.

Back of the government's financing guarantees—to Harvey Machine for a $65-million aluminum plant at The Dalles, Ore., a fortnight ago is a tale of an averted law suit.

Here's what happened, according to General Services Administration, which handles government buying:

In the third round of aluminum expansion back in 1952, Harvey was granted a fast tax write-off for its Dalles project, lined up the necessary financing, worked out power arrangements with Bonneville Power Administration, and got a letter of intent from the government covering federal purchase of 270,000 tons of aluminum.

But Congress failed to appropriate money to build power lines from Bonneville to The Dalles—and Harvey was forced to suspend construction.

By last April, negotiations were at a standstill, and Harvey (claiming it had suffered $70 million in damages) retained the New York law firm of Dewey, Ballantine, Bushby, Palmer & Wood to sue.

Recognizing the strength of Harvey's case, the agency then decided to settle out of court on the company's terms.

Harvey has assurances that it will get its power, its purchase contract, and government financing to replace the financing it allegedly lost when the U. S. failed to live up to its contractual agreements.

The off-again on-again power situation at Bonneville could, however, cause a crimp in plans.

Though currently the Administration says it can serve all interruptible industrial loads through Oct. 9, the crucial rain storage season is again at hand.

Electrochemical companies in the Pacific Northwest are worried about the future of their power supply, say additional customers will only accentuate the problem.

Another victory for fluoridation supporters is imminent this week. Final plans for fluoridating the Chicago water system have been completed and presented to the Board of Health for comment and approval. Barring complications, target date for installation of all equipment is May 1, 1956; cost per capita is estimated to be 12.5¢/year.

Business Newsletter

(Continued)

Two developments in the aluminum-producing field in Canada this week may be a sample of things to come:

• Aluminium, Ltd.—with net profits soaring 24% ahead of last year's records—appears headed for a banner year. Indications are that earnings will exceed $50 million for '55, and, barring unexpected reverses, the surge should continue well through 1956.

• Reynolds Metals Co.—through a soon-to-be-formed subsidiary, Reynolds Aluminum Co. of Canada—has completed arrangements to take over control of an aluminum sheet and foil plant at Cap-de-la-Madeleine, Que.

Additional expansion at Seadrift, Tex. That's the word from Carbide and Carbon Chemicals Co., which this week is planning construction of ethanolamine units in connection with its ethylene oxide, ethylene glycol and butadiene facilities at Seadrift. Completion is set for fall of '56, will more than double Carbide's ethanolamine capacity.

Speculation over what Du Pont will produce at New Johnsonville, Tenn., in place of its deferred titanium sponge project is intriguing chemical executives this week. Company spokesmen assert that the government's decision against further expansion of titanium sponge capacity will not result in Du Pont's abandonment of the 1,100-acre site, but insist final plans haven't been made.

Good guess: the site will be used in connection with Du Pont's paint production operations.

Construction of Phillips Chemical Co.'s long-awaited polyethylene plant near Pasadena on the Houston Ship Channel starts immediately. Capacity will be 110 million lbs./year of polyethylene.

Chattanooga, Tenn., is losing a $2.5-million plant because it can't stand the fumes. That's the story—in a nutshell—behind Tennessee Products and Chemical Corp.'s decision to move ferromanganese operations to Rockwood, Tenn—just as soon as it can build necessary facilities.

The company proposed the change as a means of meeting the city's request that it reduce fumes and dust given off by its ferromanganese furnaces.

W. M. Barnes Co. (Los Angeles) is proposing to take over and operate the $1-million wax refinery built for Sure-Seal Corp., North Lake, Utah.

The refinery—billed as the only one in the U. S. to operate on high wax (up to 47% crude) without cuts from established petroleum processing units—hasn't spun a commercial wheel since it was completed in Dec. '54.

Operations of Sure-Seal have been under court-appointed receivership since early this year; Barnes (reported to be backed by the L. Boyd Hatch interests of New York) proposes to spend $500,000 in "rehabilitating and rearranging the refinery."

Items of note:

• Union Bag & Paper Corp. directors, currently considering sites for a new paper mill, may discuss a split of the company's outstanding common stock at a meeting this week. Sales are up, should pass $120 million this year.

• Bankers across the nation are predicting slowly rising interest rates on business loans in the months ahead.

• Need some lithium hydride or samples of uranium or thorium? The Atomic Development Mutual Fund has samples for the asking—leftovers from the recent Geneva conference.

FROM TEXTILE SIZE TO HOME STARCH

THE KEY IS CMC

◆ **AT HOME**—Transparent liquid starches based on CMC make possible a new concept in home laundering. Easy to use, these starches never stick to the iron, never coat the fabric with a dulling film that clouds bright colors.

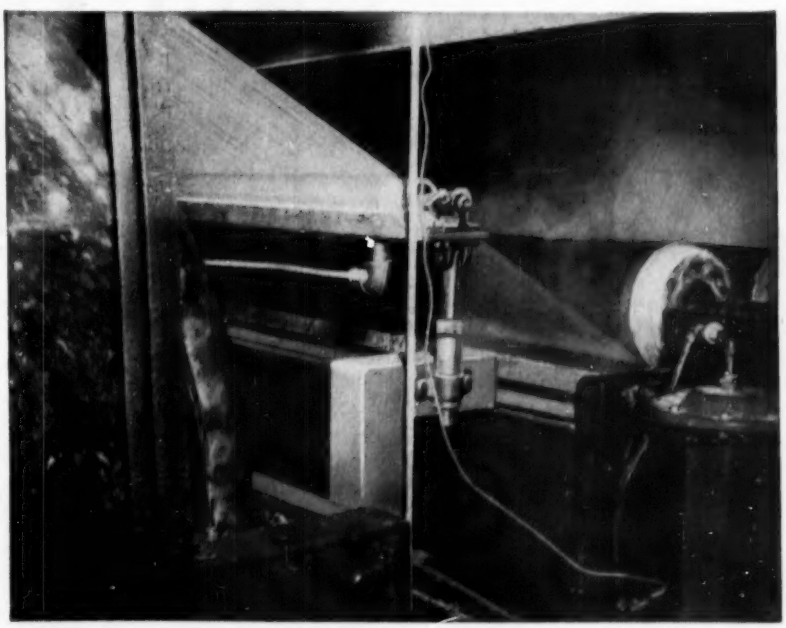
◆ **IN THE MILL**—In warp sizing, starch-CMC blends provide adequate sizing in textile manufacturing operations at lower add-ons; eliminate the need for enzymes, and cut water usage.

As a sizing agent, Hercules® CMC has been paving the way for new concepts in home starches and textile warp sizes.

An exceptionally versatile water-soluble film-former, CMC makes possible solutions that form clear, tough, flexible films. Compatible with a wide variety of gums, plasticizers, and resins, CMC is a general-purpose film former that is insoluble in organic solutions.

CMC's uniformly high quality from lot-to-lot makes it a product you can depend on for the same performance time-after-time.

Prove the value of CMC for yourself. Write for testing samples, indicating your proposed use, so proper type can be sent.



Virginia Cellulose Department

HERCULES POWDER COMPANY

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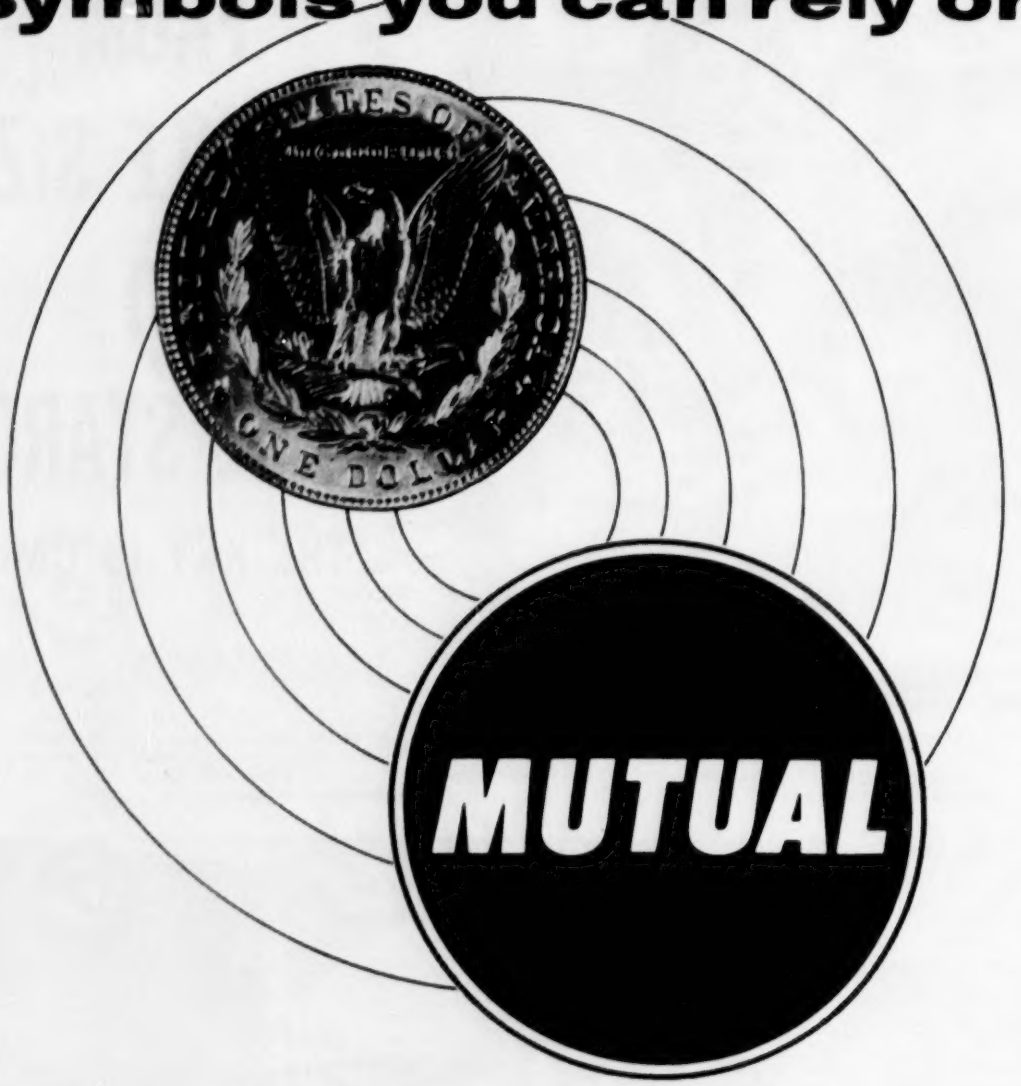
VC55-4

"symbols you can rely on"



● The seal of the United States when stamped on a silver dollar assures the holder that the coin is legal tender. As such, it is accepted throughout the world in payment for goods and services.

The Mutual seal is accepted by chromium chemical buyers with a comparable degree of confidence. Over the years Mutual has acquired an enviable reputation for quality products and dependable performance. If you are not now using Mutual Chromium Chemicals, we would be glad to consult with you on the merits of our products and service which lead so many to rely on the Mutual trade mark.

SODIUM BICHROMATE
•
POTASSIUM BICHROMATE
•
SODIUM CHROMATE
•
CHROMIC ACID
•
AMMONIUM BICHROMATE
•
KOREON (one-bath chrome tan)

MUTUAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
99 PARK AVENUE • NEW YORK 16, N. Y.

BUSINESS & INDUSTRY. . . .

HEADING THIS WAY: LOWER TARIFF RATES ON THESE ITEMS

- Acetone
- Acetic acid and anhydrides
- Alkylene aldehydes, oxides, amines and other compounds
- Aluminum salts
- Ammonium chloride
- Animal fats and greases
- Animal and fish oils
- Azides, fulminates, fulminating powder, etc.
- Balsams
- Barium nitrate
- Beryllium
- Blackings, powders, liquids, and creams for cleaning or polishing
- Caffeine and theobromine
- Calcium carbide
- Calomel and other mercurial preparations
- Carbon tetrachloride
- Cellulose acetate and other cellulose compounds
- Cerium nitrate and other cerium salts
- Cesium
- Chalk or whiting
- Chloral hydrate
- Cobalt oxide
- Compounds of casein
- Cream of tartar
- Crude drugs
- Decolorizing, deodorizing, or gas-absorbing chars and carbons
- Drugs of animal origin
- Drugs, medicinals, and similar substances
- Esters and ethers
- Ethyl methyl ketone
- Flavoring extracts, fruit esters, oils and essences
- Gelatin
- Lemon, eucalyptus, sandalwood and vetiver oils
- Lithium
- Magnesium chloride and sulfate
- Manganese compounds and salts
- Methyl, butyl and other alcohols
- Paints, varnishes, colors and pigments
- Perfume materials
- Phenol
- Phthalic anhydride
- Potassium and various salts
- Soaps and soap powders
- Sodium and various salts
- Synthetic gums and resins
- Tanning extracts
- Zinc chloride, sulfate and sulfide

Chemical Pawns in 1956 Diplomacy

It's not a staggering blow to the industry as a whole, but various individual chemical companies are seriously concerned about the list of 55 chemical categories (see table, above) that are among the 900-odd items that the State Dept. proposes to use in the new round of tariff negotiations starting next January in Geneva.

Accordingly, those companies this week are laying plans to send representatives to a pair of hearings to be held in Washington beginning Oct. 31. The Tariff Commission will hold extended public hearings to determine the levels below which tariff may not be reduced on specific products without risking injury to domestic producers. In the other hearings, the Committee for Reciprocity Information will get domestic producers' views on how the proposed tariff cuts would affect national security, price-support programs, minimum wage aims, and other broad policy problems.

This list—drafted by State Dept. with the assistance from the Commerce Dept.'s Business & Defense Services Administration *(CW, Sept. 17, p.13)*—was put together with "a conscientious effort" to exclude products wherever there was reason to believe that tariff cuts would impair security, injure domestic industry, or otherwise hurt the economy. Other items were left off because maximum allowable tariff concessions already had been made on them during the Japanese trade negotiations earlier this year.

Some Protests Expected: Most of the "sensitive" synthetic organic chemicals—particularly coal-tar chemicals—were not nominated for tariff bargaining. However, federal officials are standing by for objections on at least four of the chemical products: carbon tetrachloride, methyl alcohol, phenol and saccharin. And listing of certain other items—notably phthalic anhydride—has perturbed various U.S. producers. Even more important (from the standpoint of volume of 1954 imports) are some of the chemical metals on the list: aluminum, nickel, manganese.

The forthcoming round of tariff negotiations at Geneva will probably be the most important since the first postwar tariff conference (1947). The list of products proposed for concessions is broader than for any of the intervening conferences, and bargaining will be carried out simultaneously with at least 25 countries—the largest number yet. And the President has power to cut duty rates by 5% each year for three years. On some items, duty can be cut to 50% ad valorem.

While the U.S. government feels that the list includes few items that are "critically vulnerable" to foreign competition, the companies that make those items can be expected to speak up stoutly at one or both of the Oct. 31 hearings.

WIDE WORLD

JOHNSTON: Will start touchy alien property hearings on . . .

To Return or Not to Return

The first of a series of hearings on revision of the Alien Property Law gets under way in Washington in an atmosphere of determined tranquility. Involved is $500 million in alien property seized by the government during World War II—the subject of numerous heated hearings.

This time, Sen. Olin D. Johnston, (D., S.C.) and his subcommittee is determined to keep arguments (both proreturn and antireturn) on as even a plane as possible.

First subject of discussion will be two bills—of relatively minor importance in relation to the over-all subject. Such matters as the possible sale of General Aniline & Film Corp. (and General Dyestuffs, which was seized as a separate entity), as well as possible turnback to Schering A.G., of the money received for its former U.S. subsidiary, will be saved for later consideration—at a time when (the committee hopes) tempers will be cool, discussions calm.

Up First: Among those scheduled to testify before Johnston's group this fall will be Secretary of State John Foster Dulles, Attorney General Herbert Brownell, Budget Bureau Director Rowland Hughes and Foreign Claims Settlement Commission Chairman Whitney Gillilland.

Their views will be asked on a bill that would authorize the Attorney General to dispose of assets seized by the U.S. during World War I, and not yet disposed of. (This bill is S.2226.)

Second subject of discussion will be a more technical bill, concerning various classes of what are known as "debt claims." Best known type of claim against U.S.-seized property is the "title claim," where a person asks for return of property (or its realized value) on the ground that he previously held title to it.

Debt claims, however, are more specifically claims from persons who have a lien against vested property (or similar claims where the property in question is being held as security for a loan).

What It Would Mean: If passed, the law now up for debate would serve to relieve the Justice Dept.'s Office of Alien Property from having to process debt claims where the property in question is an obligation of the government of Germany or Japan.

Too, if passed in its current form, it would give OAP the option of throwing out claims where the property was redeemable in currency other than that of the U.S. or the Philippines.

Such decisions would be final, and not subject to judicial review. Merit of starting out with discussion of such matters, Johnston feels, is that both bills are relatively uncontroversial, will set the tone (it's hoped) for later, more incendiary sessions when chemical industry witnesses are due to appear.

No Supine Surrender

"We aren't going to take this lying down."

That, in effect, is what four Utah salt firms are saying about last week's finding by U.S. District Judge Sherman Christenson in Salt Lake City that those companies were guilty—as charged by the Dept. of Justice—of having conspired to fix prices, in violation of the Sherman Antitrust Act (*CW, March 26, p. 15*).

Three of the companies—Morton Salt, Royal Crystal Salt, and Deseret Salt—tell *CW* that they definitely will ask the Tenth Circuit Court in Denver to reverse that decision; and the fourth concern—Deseret Livestock Co.—says it's considering an appeal.

Management is far from convinced, one of the company officials indicated, that the Dept. of Justice attorneys can make these cases stick.

Facing $5,000 Fines: Sentence will be passed on Oct. 13, with the maximum penalty being a $5,000 fine for each company. Stansbury Salt Co. and President Council McDaniel of Deseret Salt Co.—named as coconspirators but not as defendants—were not subject to conviction and hence are not subject to fines.

Specifically, the principal charges were that the companies conspired:

- To eliminate price competition.
- To freeze out distributors who would not cooperate in the alleged conspiracy.
- To fix prices.
- To stabilize and control salt prices.

Judge Christenson's oral opinion came less than 24 hours after the trial ended. What persuaded him that there was a conspiracy, he added, was evidence of meetings among salt company officers, exchange of pricing information, and "policing" of competition through price inquiries from one firm to a purchaser of salt from a competing firm.

Defense attorneys stressed that exchange of price information was a convenience, not an indication of unlawful motive. They said that Deseret had raised prices simply because it was not making a profit on cut rates. That company found that it got a fair share of the market when it met price competition head on, they told the court.

BDSA Foresees Records

A year of new chemical records—that's the prediction for 1955 now envisioned by Business & Defense Services Administration's Chemical & Rubber Division. The agency's new estimates represent substantial boosts in predictions made nine months ago —and suggest that the boom will carry well into 1956. Highlights:

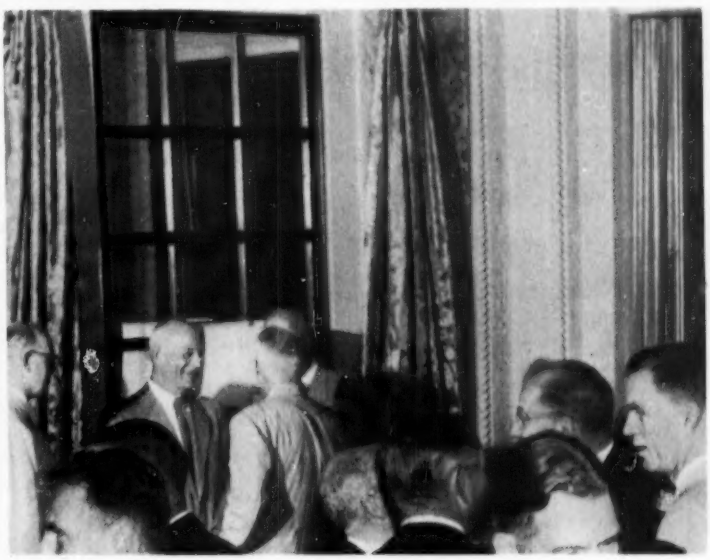
- Chemical sales will be $23.5 billion, up 20% from 1954's previous record.
- Production in '55 will top 1954 by 13%.
- Employment will total 810,000—a new record, exceeding 1953 by 0.6%.
- Wages will be up 6% over 1954, but the $83.22 weekly, and $2.02 hourly average reached in the first six months of 1955 will not materially change before the end of the year.

Commoditywise, BDSA officials predict more production records for the year:

- Some 5.8 million long tons of elemental sulfur should be produced, as well as 16 million short tons of sulfuric acid.
- Chlorine production should be up by 10%.
- Pesticide output for 1955 will "by far" exceed 1954. (Only individual exceptions to the increase: output of lead arsenate, benzene hexachloride.) Pesticide exports, moreover, will probably top $80 million.
- Crude naphthalene output in 1955 may exceed 1954 by as much as a third. Phthalic anhydride has an exceptionally bright export outlook.
- Except for a few such items as xylene and creosote oil, large-volume cyclic intermediates should show material production gains.
- Plastic production and sales this year should substantially exceed 1954 production (of 2.95 million lbs., and 2.62 million lbs., respectively).

Paint sales should exceed by about 7% the 1953 record of $1.4 billion.

As far as inventories of chemical manufacturers are concerned, BDSA predicts a "moderate buildup" during the remaining months of 1955. However, the value of inventories (which had dropped 21% as of June 30) should not climb above the equivalent of two months of sales—the level set in 1954.

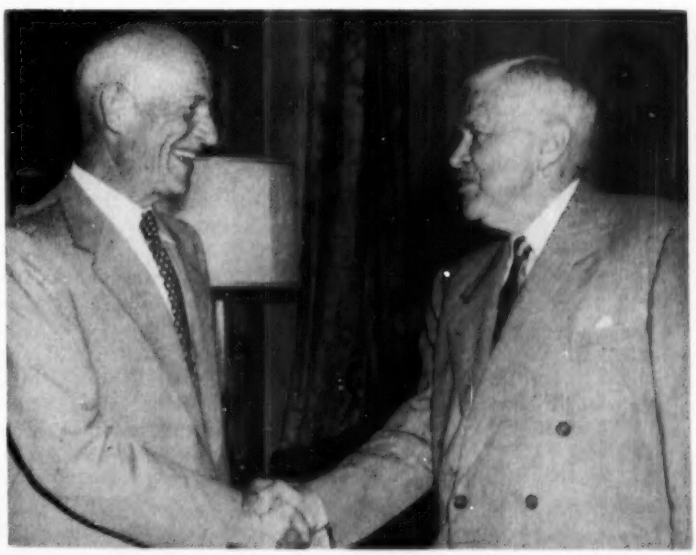


Like One of the Family

THE Manufacturing Chemists' Assn.'s new president, John E. Hull —himself no stranger to Washington ways—was introduced (*above*) last week to top government officials as the chemical industry's chief spokesman.

In attendance: some 160 top officials, including Defense Secretary Charles Wilson (*below*), Army Secretary Wilber Brucker, and such sub-Cabinet representatives as Assistant Secretaries Felix Wormser (Interior), Carter Burgess (Defense) and Lothair Teetor (Commerce).

For Hull, a retired general (and former United Nations chief in Korea, and U.S. Far East commander), it was old home night, meeting these and other Washingtonians he has come to know since 1918—when he first went to the Capitol city as a first lieutenant in the Field Artillery, and emerged as an Army deputy chief of staff.



Washington Angles »

» **Want tariff cuts on items you export?** Now that the State Dept. has published the list of chemicals on which it will negotiate lower duties (p. 21). Chemical & Rubber Division of Business & Defense Services Administration is open for suggestions on concessions to be asked in exchange.

» **Automation and patent laws** will be investigated before year's end by two Congressional committees. Representative Patman will run the automation investigation Oct. 14-28; Senator O'Mahoney is due to scan the whole patent picture, but mainly check a wide variety of perennial complaints.

» **Synthetic rubber plant disposal** is also due to be probed for political pay dirt. Senate investigation is scheduled for early 1956, will revive the old give-away charges that failed last year.

» **Salicylate warning labels** will soon be required by the Food & Drug Administration. The agency, alarmed over the increasing number of poisoning cases among children, is currently readying the order. Objective: to acquaint parents with danger of leaving aspirin bottles within a child's reach.

» **Grain fumigant and protectant makers** will have a bigger market next year. Reason: Food & Drug will tighten its clean-grain standards. And in addition, farmers will have to improve sanitation to qualify for Agriculture Dept. price supports.

» **More East Coast petrochemical production?** American Pipe Line Corp., a company asking U.S. aid for Texas-East Coast oil product pipeline, tells mobilizers its pipeline would carry liquefied petroleum gases in addition to oil products to the Middle Atlantic States. Chances of approval, however, aren't too bright.

» **Don't look for transportation rate cuts** to come as a result of the current transportation policy hearings. Rail-truck-barge conflicts are as deep as ever, so lawmakers won't make rate-cutting easier.

» **Where to locate new chemical plants** is the subject of a Massachusetts Institute of Technology report just made available by the Commerce Dept. Methane-, ethylene- and acetylene-derived products are covered. Get a copy (PB 111640) for $3 from the Office of Technical Services, Washington 25, D. C.

COMPANIES . . . .

Aetna Oil Co., subsidiary of Ashland Oil & Refining Co., will convert its Louisville, Ky., facilities from refining crude oil to manufacturing petrochemicals. Conversion costs: several million dollars.

Refining activities will be transferred to Catlettsburg, Ky.

•

Cutter Laboratories is expected to borrow $3 million from Mutual Life Insurance Co. of New York at a rate of 4½% for 20 years. The loan will be made in two parts—$2 million containing sinking fund provisions, and $1 million carrying a conversion feature permitting purchase (by Mutual) of Cutter limited voting stock at $14.25/share at the option of the lender.

Proceeds will be used to retire the balance of a long-term note held by John Hancock Life Insurance Co. and for general working capital.

•

Delhi-Taylor Oil Corp.'s potash venture in the Seven Mile Anticline area of Grand Canyon, Utah, is now attracting other drillers.

Oil Securities and Uranium Corp. is the latest newcomer to the region, has contracted (with Joy Drilling Co.) to sink two 1,800-ft. potash test holes.

•

General Mills' soybean operations—now part of the company's Chemical Division—will be established as a separate division, effective Oct. 1.

EXPANSION . . . .

Polychemicals: Polychemical Industries, Ltd., plans to build a $225,000 polychemical plant at Edmonton, Alberta. The plant will use polyethylene produced by Canadian Industries, Ltd., will have an initial annual capacity of 558,000 lbs. of pipe, sheeting, packaging film, and other related products.

•

Sulfuric Acid: Inland Chemical, Canada Ltd., has brought its $1-million sulfuric acid plant at Fort Saskatchewan, Alberta, onstream. Located adjacent to Sherritt-Gordon Mines' nickle ore processing plant, the Inland plant will use (as feed stock) sulfur produced by Shell Co. Canada, Ltd., at Jumping Pond, Alberta.

•

Tetraethyl Lead: Du Pont will expand its Antioch, Calif., tetraethyl lead and refrigerants plant at a cost of several million dollars.

Scheduled for initial production in early 1957 are units to manufacture sodium, ethyl chloride, tri- and perchlorethylene. Capacities: unrevealed.

•

Synthetic Fibers: Carbide and Carbon Chemicals Co. will expand its Dynel producing capacity at South Charleston, W. Va., by 35%. Estimated date of completion Feb. '56.

•

Plastics: Dow Chemical Co. starts construction this month of a new plant at Torrance, Calif., to produce Styrofoam—its multicellular plastic.

•

Gypsum Board: United States Gypsum Co.'s $30-million expansion program at Plaster City, Calif., is due for an increase. Under augmented plans, gypsum board and lath capacity will be increased to provide materials for an estimated 45,000 new homes annually.

•

Acrylic Fibers: Du Pont Co. of Canada, Ltd., will build a new plant at Maitland, Ont., to manufacture Orlon—an acrylic fiber. Cost of the plant: as yet undisclosed.

TWO FOR THE MONEY...

Chemist and Engineer—

one in a development group creating new chemical forms and compounds to make Celanese* petrochemicals more productive industrial materials. The other in a special engineering section devising new processes and controls to produce these chemicals economically—and in continuous market-stabilizing volume.

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Ketones
Oxides
Polyols

Plasticizers
Salts
Solvents
Synthetic Oils
Vinyl Monomers

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CHEMICALS

In textiles, plastics, agriculture, paper, surface coatings, electrical and building materials and equipment, pharmaceuticals.

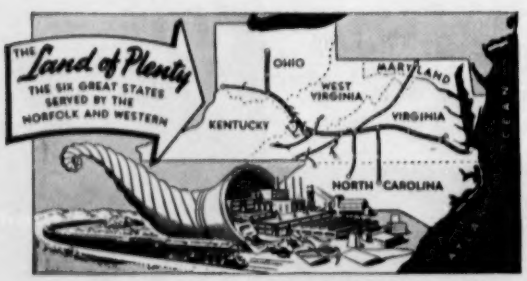
. . . By Looking Back

Looking back, the past 15 years have produced a tremendous industrial growth in the Land of Plenty, the six great states served by the N & W.

This look into the past is a look into the future for other companies which will locate here in the years to come.

The chemical plants which have moved into the Land of Plenty represent all types, and all sizes — from nationwide concerns to small operations — producing a wide range of chemical products and meeting a wide range of specific location problems. The fact that such plants have found the advantages they require in the Land of Plenty is a promise that others will have the same advantages when they locate here.

By looking into the Land of Plenty's past you'll see why many of the nation's most progressive manufacturers and marketers have put their roots down here. Look ahead: there's a bright future for *your* plant here, too!



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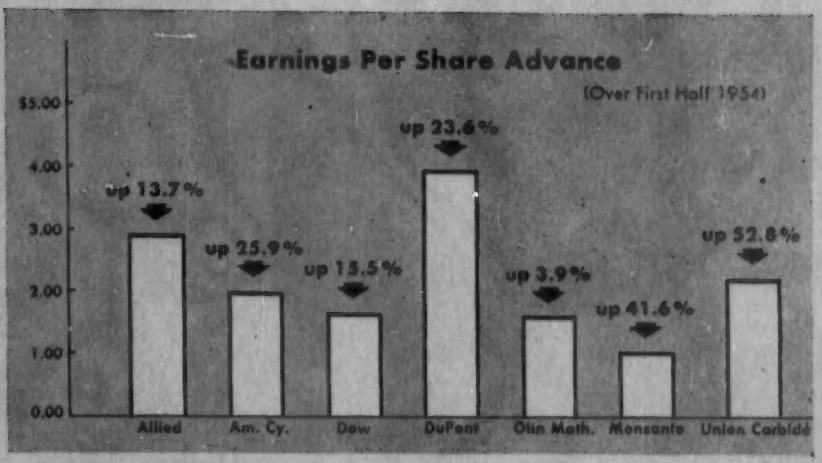
Charting Business

CHEMICAL WEEK
OCT. 1, 1955



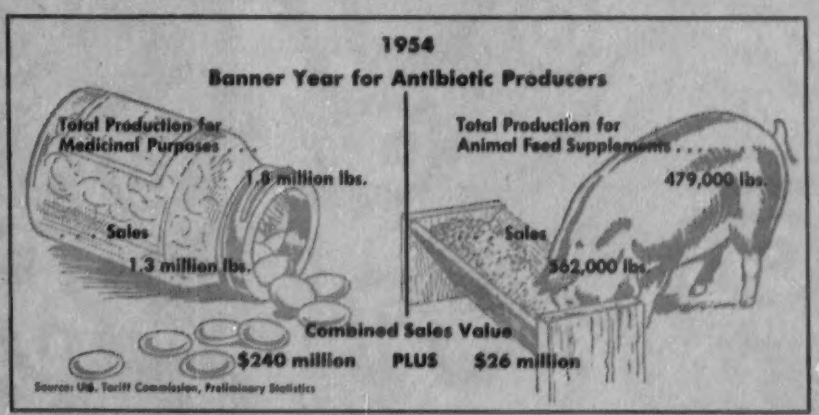
Earnings of leading chemical companies* rose spectacularly during the first six months of 1955—but company executives are predicting it's only a sample of things to come.

Early estimates of full-year earnings per share place Allied at $5.60, American Cyanamid around $4, Dow at $2, Du Pont at $9, Olin Mathieson at $3.30, Monsanto at $2.10 and Union Carbide at $4.70.

* Dow fiscal year ends May 31; Olin Mathieson figures *pro forma*.

Too, if current signs prove reliable, earnings over the first half of 1956 should continue to rise—though at a slower rate than during preceding months.

Smaller chemical process firms are scoring almost equally staggering earnings records. With few exceptions (where the slack-off in business can be explained by an isolated case of unusual business conditions), the entire industry is riding the crest of an unprecedented prosperity wave.



Bucking the trend of medicinals (which fell in sales from 67 million to 66 million lbs. in 1954), consumption of antibiotics reached all-time records (*see table*).

Production of antibiotics likewise reversed the general pattern set by medicinals in general. Production of penicillin salts in 1954 amounted to 477 trillion international units (compared with 372 trillion units produced in 1953). Production of dihydrostreptomycin and streptomycin in 1954 was 446,000 lbs. and 141,000 lbs. respectively. Combined output of other antibiotics (including chlortetracycline, chloramphenicol, and oxytetracycline) totaled 597,000 lbs. Outlook in '55: another pennant for antibiotics.

Charting Business

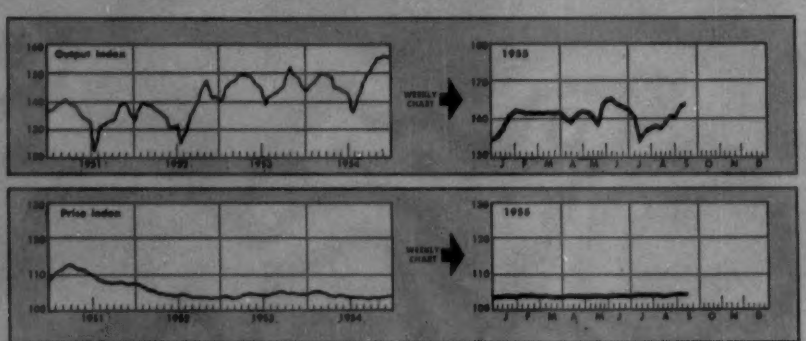
(Continued)

Buying Power of Farmers . . .
Now Varies Widely
Here's where trouble lies.
Dairy belt is doing well. Relatively stable prices, high incomes.
Corn belt will have incomes only slightly lower than in 1954.
Drought, and a cutback in government support means lower incomes in the wheat belt.
South is facing lower income prospects this year but should prove solid sales territory over the long haul.

To chemical companies with products aimed for farm consumption, the sales outlook for 1956 is unsettled. Reason: in certain sectors of the U.S. farm income has slipped off badly (*see map*).

Cutbacks in government support are blamed (in many quarters) for the pinch in the Northwest sector; in the South, a cutback in cotton acreage is causing lower incomes; decreased prices of hogs in the corn belt has chipped into incomes; in the wheat belt, droughts and generally lower prices are playing havoc with income.

Agriculture Dept. experts are convinced, however, that the slump is only temporary, that chemical suppliers should suffer only a "relocation of sales efforts."



WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947-49=100)	164.8	164.2	149.4
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.3	104.5	104.2
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	488.3	487.8	326.5

MONTHLY INDICATORS —Trade (Million Dollars)	Manufacturers' Sales			Manufacturers' Inventories		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All Manufacturing	$26,763	$27,111	$23,209	$43,920	$43,779	$43,431
Chemicals and allied products	1,884	1,985	1,569	3,040	3,024	2,946
Petroleum and coal products	2,328	2,386	2,124	2,753	2,713	2,763

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Girdler recently engineered a polyethylene plant for Texas Eastman Company to a process licensed by Imperial Chemical Industries Ltd. Engineering management of Texas Eastman reports: *"The polyethylene plant has operated extremely well, thanks in large part to the very fine job everyone at Girdler did for us. Time and again, we can see where the thought that went into the layout and piping up of equipment has paid off in a very large way. We know that no other group could have done a better job, and it is highly unlikely that anyone would have done as well by us as Girdler".*

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VOTATOR DIVISION: New York • Atlanta • Chicago • San Francisco
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GIRDLER DESIGNS processes and plants
GIRDLER BUILDS processing plants
GIRDLER MANUFACTURES processing apparatus

GAS PROCESSES DIVISION:

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Hydrogen Cyanide Plants	Sulphur Plants
Hydrogen Sulfide Plants	Ammonia Plants
Synthesis Gas Plants	Formaldehyde Plants
Carbon Dioxide Plants	Ammonium Nitrate Plants
Gas Purification Plants	Hydrogen Chloride Plants
Plastics Materials Plants	Fertilizer Plants
Carbon Monoxide Plants	Phosgene Plants

Catalysts & Activated Carbon

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Strained Food	Citrus Concentrates

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Foam Rubber Drying	Plastic Preform Pre-Heating
Automotive Trim Heat-Sealing	Foundry Core Baking
Vinyl Foam Fusing	Wood Bonding
Plastisol Fusing	

GROWTH AND GRIME . . .

From 1940 to 1955 in Harris County,

POPULATION is up by 93%
(with more stoves, heaters, and back yard grills)

UNITED PRESS

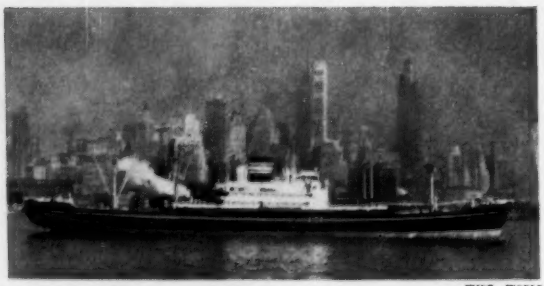
RAILROAD TRAFFIC is up by 133%
(with smoke and oil fumes)

WIDE WORLD

and TOTAL MANUFACTURING is up by 1,250%
(with all kinds of contaminants)

WIDE WORLD

MOTOR VEHICLES in use are up by 157%
(with various exhaust fumes)



WIDE WORLD

SHIP TRAFFIC is up by 60%
(more smoke and oil fumes)

So it's small wonder that there's a pollution problem, with more engines and machinery to create fumes and more people to notice them.

But even though oil, chemical and allied plants along the Houston Ship Channel have been increasing their production by an average of 25% each year, they managed last year to cut down on contamination by these amounts*:

Organic dusts	**virtually 100%**
Chlorine gas	**95%**
Hydrochloric acid gas	**94%**
Hydrogen sulfide and mercaptans	**55%**
Sulfur dioxide and trioxide	**34%**
and over-all contamination by	**16%**

* Based on reports by companies.

Industry's Lot: Faint Praise and No Peace

On some days, it seems, you just can't win; and even though the more than 40 chemical process plants along the Houston Ship Channel on the Texas Gulf Coast keep right on putting big money into research and equipment for air pollution control and have made substantial progress in abatement of smoke and fumes (*see table, above*), they're on the spot again in a new and noisy outbreak of the Harris County pollution fracas.

Things had quieted down fairly well last year (*CW, July 10, '54, p. 20*), and it appeared that the local populace had come to realize that all—or nearly all—of the industrial concerns were doing their best to keep air contamination low while still keeping production and employment high.

This year, however, residents, service clubs and local newspapers have been getting more impatient and belligerent on the issue. Their agitation has stirred up a political clash that has tended to magnify the whole dispute—all at the expense of the industry's community relations.

Tale of Two Men: No community row is complete without a few contro-

ATTORNEY HOLMAN (wearing glasses): He's charged with 'indifference'.

versial figures; and this one has two: County Attorney Burke Holman, whose duties include enforcing the antipollution laws through civil lawsuits; and Pollution Control Director Walter Quebedeaux of the County Health Unit, who's supposed to track down sources of pollution and try to persuade those responsible to adopt abatement measures.

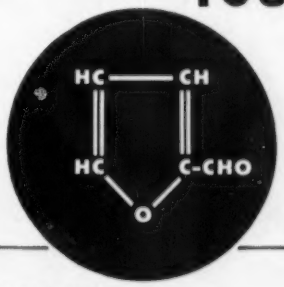
These two officials started out on good terms when the Pollution Control Section was established some two years ago. Since then, they've had a falling out that—because it has affected the pollution control program—was aired at a recent meeting of the county commissioners (*see cuts, above and below*).

Quebedeaux sides with the more aggressive faction that accuses Holman of inaction and indifference. Holman and his supporters criticize Quebedeaux for being too hasty to crack down via litigation; for rushing into court without getting enough evidence; for bypassing Holman in filing suits; for being "a poor witness and a worse lawyer" in trials; and for failing to supply evidence as requested by Holman.

The county commissioners—who tell *CW* that only a few plants have lagged on voluntary pollution control—have told Quebedeaux and Holman to work together, and have authorized Holman to retain an air pollution specialist as an expert witness. While the Houston chemical companies would prefer to avoid litigation, they may stand to gain by showing the courts how much they've done and how much they're doing to cut contamination down to size.

CHEMIST QUEBEDEAUX (pointing finger): He's said to be 'vindictive'.

WHAT CAN THIS DO FOR YOU?



DESCRIPTION

An amber-colored, mobile liquid with an odor like oil of bitter almonds.

PROPERTIES

Specific Gravity, (20/20°C.)	1.161
Boiling Point, °C. (Todd Still), 744 mm.	160 (98%)
Freezing Point, °C.	—36.5
Flash Point, (open cup), °F.	150-160
Refractive Index, (n 20°/D)	1.526
Surface Tension at 20°C. (dynes/cm)	49.
Viscosity (Centipoises)	
38°C.	1.35
54°C.	1.09

In addition to properties it possesses in common with other aldehyes, furfural exhibits a chemical behavior peculiar to the unsaturated furan nucleus. As a consequence it is commanding increasing interest as a chemical intermediate.

Its versatility, high purity and low price are reasons why you should evaluate furfural in processes and products involving its use as a selective solvent, resin ingredient, general solvent, wetting agent, and chemical intermediate.

Write for Bulletin 204. A few words as to the nature of your interest will enable us to select for you other pertinent literature about

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WIDE WORLD

HIGH COURT'S NEW LINE-UP*: In fall term, chemical cases may bring . . .

Antitrust Unscrambling

Crucial decisions on product monopoly, overseas sales arrangements, divestiture of plants, and other issues are expected in the chemical industry cases coming before the U.S. Supreme Court in the term starting next week.

The docket is studded with important cases of particular concern to this industry (*see table*). One of the first items on the agenda: arguments on the cellophane antitrust case, in which the U.S. Dept. of Justice is seeking reversal of a district court's decision that Du Pont's cellophane business does not constitute a monopoly.

* Left to right: seated—Felix Frankfurter, Hugo Black, Chief Justice Earl Warren, Stanley Reed, William Douglas; standing — Sherman Minton, Harold Burton, Tom Clark, John Harlan.

Antitrust Precedent: This is probably the most significant chemical case now on the docket, because it may lead to an important change in the legal definition of product monopoly—and thus affect every firm that accounts for more than 50% of U.S. production or sales of any special-use, tradename article.

The trial court in Wilmington, Del., threw out the government's monopoly charges despite a showing that Du Pont had 75% of the cellophane market. Reasoning: cellophane has to compete with a number of other flexible wrapping products.

Overshadowing the cellophane suit is the still bigger antitrust case against Du Pont, General Motors, and U.S. Rubber. If the high court agrees to hear this appeal, the Justice Dept. will try to show that the district court in Chicago erred in throwing out the charge that Du Pont's ownership of GM stock (23%) gave it working control of the automotive giant and set up protected markets for Du Pont.

Competing Abroad: The Holophane case brings up a point that's basic to all U.S. companies doing business abroad. Holophane—found to have participated in an illegal cartel with French and English companies engaged in making prismatic glassware—has been ordered to "affirmatively compete" in foreign territories that had been allocated to the foreign firms. Holophane is challenging the legality of that order.

Still another case involving the antitrust laws revolves around interpretation of a 1952 consent decree between Liquid Carbonic and the Justice Dept. The court had ordered that two Carbonic plants be sold, and the company is trying to get clearance to use one of those plants until somebody buys it.

The Leslie Salt Co. case—accepted for hearing but not yet scheduled for argument—may result in a ruling on whether companies that give promissory notes to secure long-term loans from insurance companies have to pay the documentary stamp tax.

This sampling of cases—if it's any indication of what's ahead in the coming nine months — foretells a season full of decisions that'll be important elements in the industry's future economic environment.

PENDING ON THE POTOMAC

(Cases of chemical industry significance to be considered by the U. S. Supreme Court this term)

- **U.S. vs. Du Pont, General Motors, and U. S. Rubber Co.—Probably biggest case this term for the industry and the court is this antitrust attempt to force Du Pont to give up its interest in GM.**
- **U.S. vs. Du Pont—Another big antitrust action, this one over Du Pont's position in the cellophane business.**
- **Mastro-Plastics Corp. vs. National Labor Relations Board—Broad policy test on when a union can strike against allegedly unfair labor practices.**
- **Schwegman Bros. vs. Hoffmann-LaRoche, Inc.—Another attack by the New Orleans supermarketer on "fair-trade" pricing protection for prescription drugs.**
- **Corn Products Refining Co. vs. Commissioner of Internal Revenue —At stake: company profits under tax law relating to commodity futures sales.**
- **Liquid Carbonic Corp. vs. U.S.—A battle over the company's right to use its plants after signing an antitrust consent decree.**
- **Holophane Co., Inc., vs. U.S.—Significant test of court power to make former members of an international cartel compete in foreign markets.**
- **Walker vs. Cutter Laboratories—The issue: whether a private employer can discharge an employee for "Communistic activities."**

LEGAL

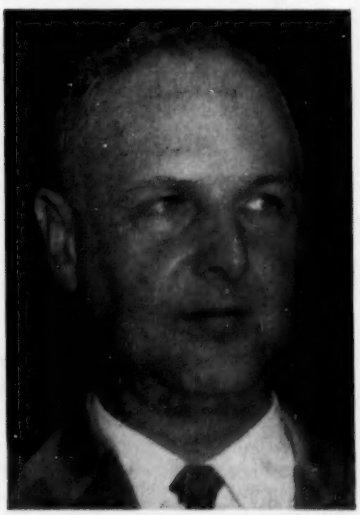
Fuels and Feedstocks: Prices and supplies of oil and natural gas—used as fuels and feedstocks in countless chemical plants—are at issue in three cases this week.

In Washington, attorneys for natural gas producers are thinking of further action in the Deep South Oil and Dixie Pipe Line cases, in which the Federal Power Commission—headed by Jerome Kuykendall—has broadened its jurisdiction over gas prices.

At Owensboro, Ky., U.S. District Judge Henry Brooks is weighing arguments over the state's, Henderson County's and private landowners' rights to oil deposits under the Ohio River.

•

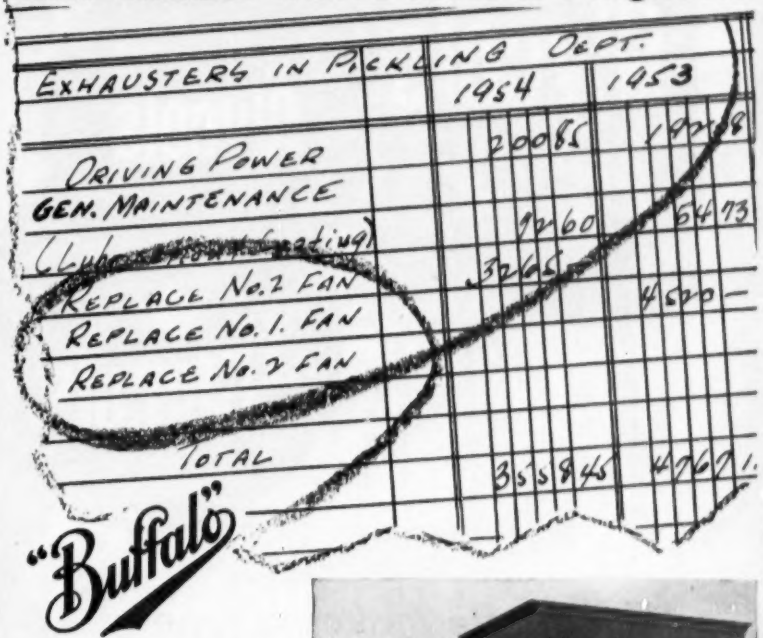
Live and Let Live: It appears that an end has come to the three-way cold war that started when Armour & Co. received its 1951 patent on a catalytic lard-into-shortening process. Earlier, Swift & Co. and Procter & Gamble made peace between themselves (*CW, Feb. 5, p. 28*); and later P&G won recognition for its own process. Now there's an out-of-court settlement of the Armour-vs.-Swift infringement suit, with Swift paying $250,000 for rights to Armour patents and Armour getting a royalty-free license to use Swift technology. Swift can now license other processors under Armour patents, but will split royalties 50-50 with Armour.



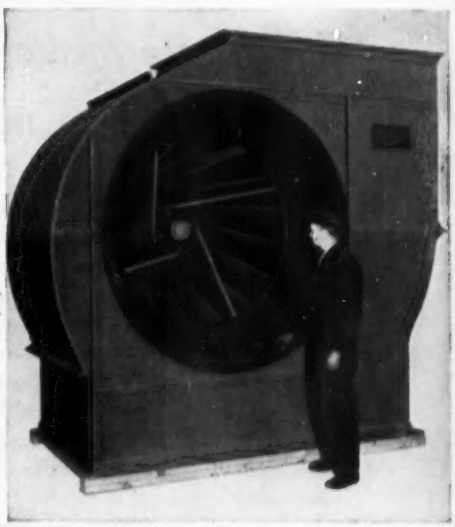
WIDE WORLD

FPC'S KUYKENDALL: For natural gas users, more regulation of prices.

CUT YOUR FUME HANDLING EXPENSE *where costs are highest!*



RUBBER-LINED EXHAUSTERS LAST 3 TO 12 TIMES LONGER THAN ORDINARY FANS!



Ever analyze your costs of removing corrosive fumes? If the exhausters are ordinary metal, without a doubt, your costs will prove high; and the most costly item will be exhauster replacements! Get exhausters that last longer, and you've cut the biggest part of your costs.

"Buffalo" Rubber-Lined Fans outlast other fans because all interior parts are protected from the fumes by a layer of rubber vulcanized to the metal. It's nothing new — these "Buffalo" Fans have been saving money and down-time for chemical industries for years and years. They're ready to do the same for you. Write for *Bulletin 2424-F* and see the "Buffalo" "Q" Factor* ready to work for your plant.

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Generally speaking, glycols are thought of only as a base for permanent-type antifreeze formulations. Industry, however, has been finding numerous and interesting uses for them. ¶ Ethylene glycol, for example, is used for low-freezing dynamite, and in the manufacture of cellophane for stronger, more pliable products. It is used, too, as an inhibitor and coolant, as a base for polyesters, as hydraulic fluid for brakes and shock absorbers, and in many other applications. ¶ Diethylene glycols are used as tobacco humectants, sizing agents, steam-set printing inks, yarn conditioners, softening agents for adhesives, in dehydration of natural gas, as plasticizers for composition cork, and in alkyds and resins. ¶ In addition, ethylene dichloride, and dichloroethyl ether are both widely accepted in industry. ¶ Wyandotte produces a variety of these glycols to meet every demand . . . we'll be happy to furnish you with information on any of them. Write us in full detail, telling us about your product needs or processing operations. *Wyandotte Chemicals Corporation, Dept. CW, Wyandotte, Mich. Offices in principal cities.*

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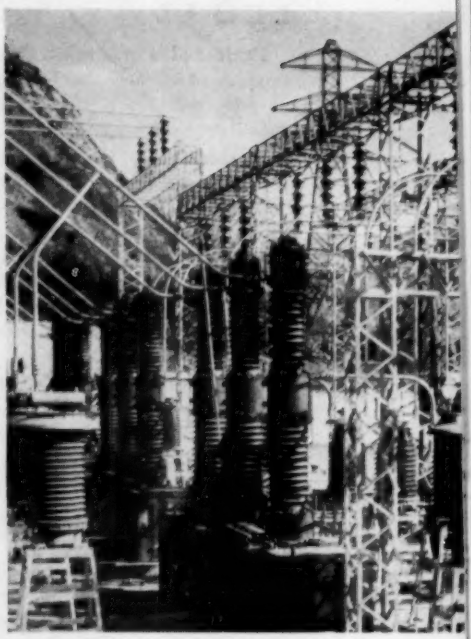
SYNTHETIC DETERGENTS • OTHER ORGANIC AND INORGANIC CHEMICALS



PECHINEY: St. Jean de Maurienne acetone

FOREIGN. . . . . .

Expansion/France: With its home industry (led by the giant firm, Pechiney) operating at close to capacity, the French government is again authorizing foreign-owned companies to build producing units in France.

Most recent U.S. company admitted: California Spray Chemical Co.—a Standard Oil of California subsidiary—which will be permitted to build organic fungicide-producing units outside Marseille.

Officially, the plant will be built and managed by Compagnie Francaise California Spray Chemical and is due to cost $1.5 million. Estimated date of completion: fall, 1956.

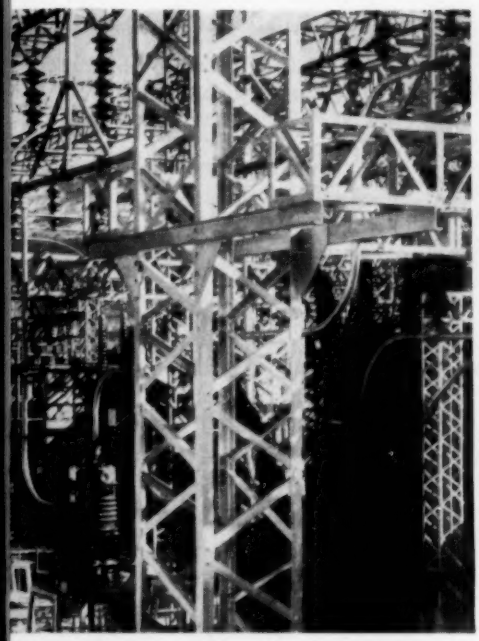
•

Pharmaceuticals/Mexico: Plans to build a $5-million pharmaceutical plant in the state of Nuevo Leon have been submitted to federal planning commissions in Mexico City.

If approved, the plant will be located at Sabinas Hidalgo, and will utilize power from the recently completed Falcon hydroelectric plant.

•

Pharmaceuticals/Philippines: Winthrop-Stearns will build a $2.5-million pharmaceutical manufacturing plant in Mandaluyong, Rizal, just outside Manila in the Philippines.



plant now operates at full capacity.

Winthrop-Stearns (a Sterling Drug subsidiary) has been exporting products to the Philippines since 1928; now the company plans to extend its sales operations to the general southeast Asian market.

Initial products due to be turned out at Rizal: various ethical drugs (to treat malaria, dysentery, and schistosomiasis), anesthetics, analgesics, cationic germicides, antihypertensives, and vitamins.

Later expansion into production of fine chemicals is under consideration.

•

Phosphates/North Africa: French North African phosphate producers are extending their operations in South America as a means of guaranteeing markets in the face of rising competition.

First ticketed for construction: a plant at Penco, Chile (to be built by Compagnie Nord Africain de l'Hyperphosphate Reno), with a capacity of 45,000 tons of superphosphates annually — produced from phosphate rock imported from North Africa.

•

Resin Glue/Philippines: Borden Co. (New York) will build a synthetic resin glue plant at Manila, at a cost of $750,000. Completion is scheduled for spring, 1956; initial capacity: 500,000 lbs. of glue annually.

Searching for the answer?

check with us

When groping about for the right answer to a problem, you naturally look to an approved, reputable source. So . . . when you are looking for specific and technical answers to problems involving chemicals, may we suggest that you try us? ¶ As a leading producer of chemicals for over 65 years, we've been able to come up with many of the right answers – to solve many problems for our customers. Perhaps we can help solve yours, too! ¶ Fact is, we pride ourselves in giving our customers the personalized service they demand and deserve: We have one of the most modern, up-to-date research labs in the country . . . our staffs include people dedicated solely to product research. Our skilled chemists and engineers can assist you in improving your manufacturing or processing operations. ¶ It might pay you handsomely to investigate us and our facilities. If you have technical problems involving chemicals within our manufacturing background, why not write us about them in full detail? *Wyandotte Chemicals Corporation, Technical Inquiry Section, Wyandotte, Mich. Offices in principal cities.*

Wyandotte CHEMICALS

HEADQUARTERS FOR ALKALIES

AGREEMENT REACHED: In accord with Consolidated directors, Hans Stauffer and Christian de Guigne (right) have drawn up a . . .

Plan for Merger

In a move designed to lift combined sales close to $120 million annually, directors of Stauffer Chemical Co. and Consolidated Chemical Industries, Inc., last week agreed on terms of the merger of Consolidated into Stauffer.

If approved by stockholders, 3¼ shares of Stauffer common* will be offered for each share of Consolidated Class A participating preference stock, excluding shares of Consolidated already owned by Stauffer. (Or exchange of 698,038 shares of Stauffer for 214,781 of Consolidated.) And Consolidated operations will be continued as a division of Stauffer.

Long-Signaled Move: Behind the actual word that the two companies will actually merge operations, however, is an interesting sequence of events.

Stauffer, which holds all of the Class B voting stock of Consolidated, was a prime mover in the formation many years ago of the predecessor companies of Consolidated.

Upon the death of Sol Peiser (Consolidated president) in 1951, Stauffer increased its stock holdings in Consolidated, gradually moved closer to its San Francisco affiliate.

Public offerings (of 325,000 shares of $10 par value common stock and $15 million in debentures) in 1953—were the tip-off, observers now say, to the fact that Stauffer was contemplating a move in the direction of expansion through acquisition—probably through merger with Consolidated.

But until this week, all has been quiet in San Francisco headquarters.

Why Now? Why merge now?, industry men may ask.

Stauffer spokesmen refuse to comment on why this particular moment has been chosen, apart from saying that merger of the two firms will materially aid both.

But the solidification of activities makes good economic logic from a management point of view.

Consolidated, in recent years, has greatly increased its production facilities (sulfuric acid capacity, for example, has jumped some 100% in the past 10 years). Stauffer, likewise, has been engaged in a heavy expansion program within the past several years.

Expanding facilities further now would mean a heavy capital investment; either company would have to go to the public for funds for these projects.

With merger, the expansion problem is neatly solved without resorting to additional debt; and stockholders of both companies stand to profit from the move.

* Stauffer has 2,350,240 shares outstanding.

Watch on the Boom

Though its activities have been generally eclipsed in recent months by the more flamboyant moves of other Congressional committees, the Fulbright Senate Banking Committee is nevertheless keeping a close eye on the still-booming stock market.

No plans are now afoot to hold another investigation of Wall Street, but committee members frankly admit that they will hold a series of hearings (probably early next spring) to determine "why" the steady rise in blue-chip industrials.

Since the Fulbright hearings, terminated some six months ago, the average of big industry stocks has bounced back about 25%—above the peak hit on the eve of the big crash of '29.

Many Reasons: Numbers of reasons have been offered as to why the bull market in blue-chip stocks. Investment activities by union pension funds, for example, have been held forth as a major factor in the spurt. Heavy buying by big insurance companies, mutual funds, and bank-managed trusts have been offered as other reasons for the rise.

Senator Fulbright (and his committee) would seem to be satisfied, in part, with this explanation, but seems equally convinced that a "friendly investigation" of such matters is a healthy thing. Thus "blue-chip" firms can well expect to be out on the public carpet again—come spring.

WIDE WORLD

FULBRIGHT: Plans 'friendly inquiry' on recent rise of 'blue chip' stocks.

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Baker { ZINC NITRATE, technical / CALCIUM NITRATE, technical

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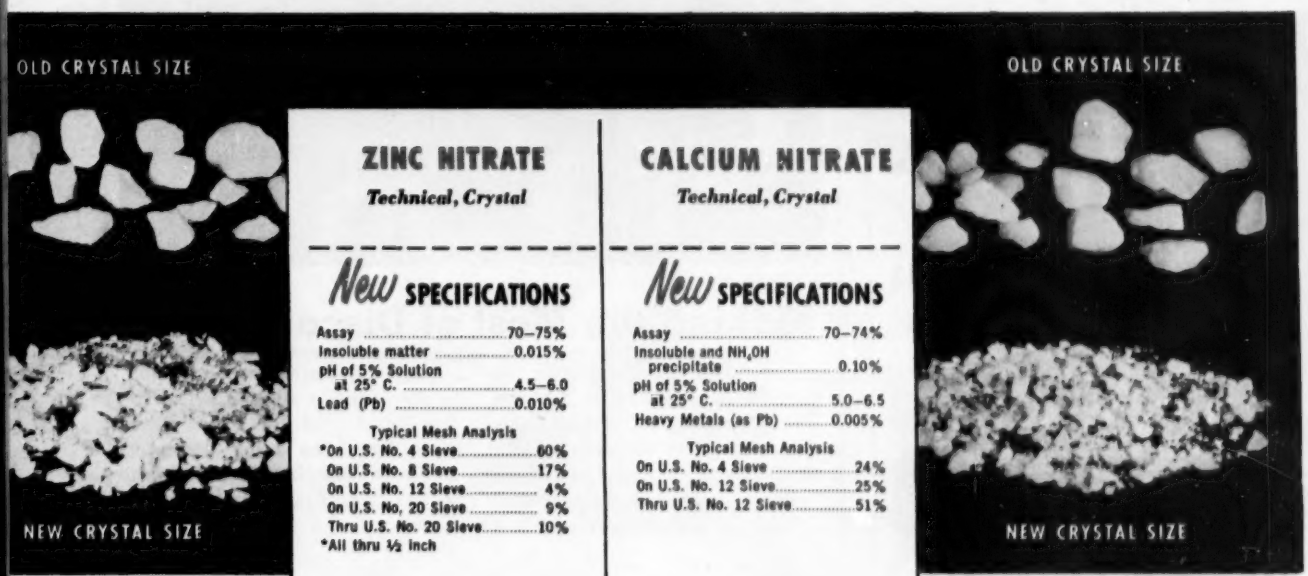

ZINC NITRATE

Technical, Crystal

New **SPECIFICATIONS**

Assay	70–75%
Insoluble matter	0.015%
pH of 5% Solution at 25° C.	4.5–6.0
Lead (Pb)	0.010%

Typical Mesh Analysis

*On U.S. No. 4 Sieve	60%
On U.S. No. 8 Sieve	17%
On U.S. No. 12 Sieve	4%
On U.S. No. 20 Sieve	9%
Thru U.S. No. 20 Sieve	10%

*All thru ½ inch

CALCIUM NITRATE

Technical, Crystal

New **SPECIFICATIONS**

Assay	70–74%
Insoluble and NH_4OH precipitate	0.10%
pH of 5% Solution at 25° C.	5.0–6.5
Heavy Metals (as Pb)	0.005%

Typical Mesh Analysis

On U.S. No. 4 Sieve	24%
On U.S. No. 12 Sieve	25%
Thru U.S. No. 12 Sieve	51%

The two photographs reproduced above show two chemicals of great importance to many industries–Zinc Nitrate and Calcium Nitrate, Technical, Crystal.

Each is shown in two forms: the new, smaller crystals which Baker is now shipping; and the large crystal size previously supplied. These chemicals in the new form offer many prime advantages to industrial users. They go into solution *faster*. You'll find them much easier to handle—simpler to mix with other ingredients.

Baker Zinc Nitrate and Calcium Nitrate Technical in smaller crystal size will save *time*—a vital consideration in any industrial process.

The new specifications for each are included with the photographs. Note that Zinc Nitrate now assays 70-75%, a significant improvement over the previous figure of 63% minimum. This higher assay means you get more Zinc Nitrate for your money – a drier product with a higher melting point – one that will stay free-flowing longer. For maximum protection, these chemicals are packaged in polyethylene liners and are stored in air-conditioned warehouse space.

Note also that both chemicals have a high degree of purity – low insoluble matter and low heavy metals plus controlled pH – qualities which mean dependable, predictable results time after time.

Remember–the only reason for change in the specifications of any Baker chemical is to make it a better product–easier, faster, more economical for *you* to use. *It pays to buy Baker!*

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Executive Offices, Phillipsburg, N. J.

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"Purity by the ton"

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3-3½-4-5-
6-6½-10-12

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Prompt
Large or Small
Shipments—

of all Trade Styles

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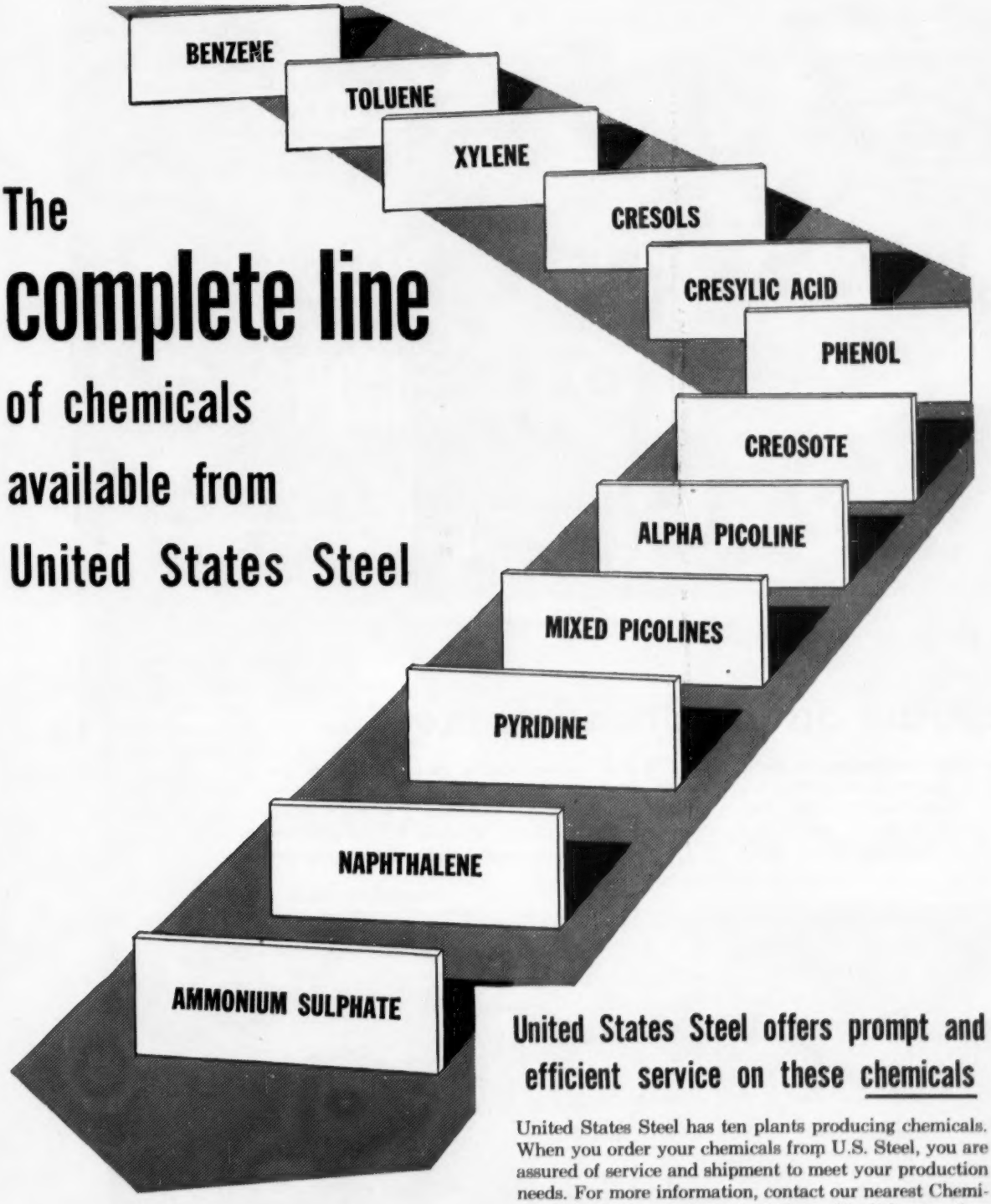
IN A GESTURE heartily applauded by residents of Baytown, Tex., Consolidated Chemical Industries, Inc., has donated to local Scout troops four wood-and-metal buildings located at the site of its new sludge acid regeneration plant.

After dismantling, one building is now in use as a Boy Scout meeting house (*above*), and three others have been used to construct permanent shelters (*like that shown below*) at Girl Scout and Brownie retreats.



The complete line of chemicals available from United States Steel

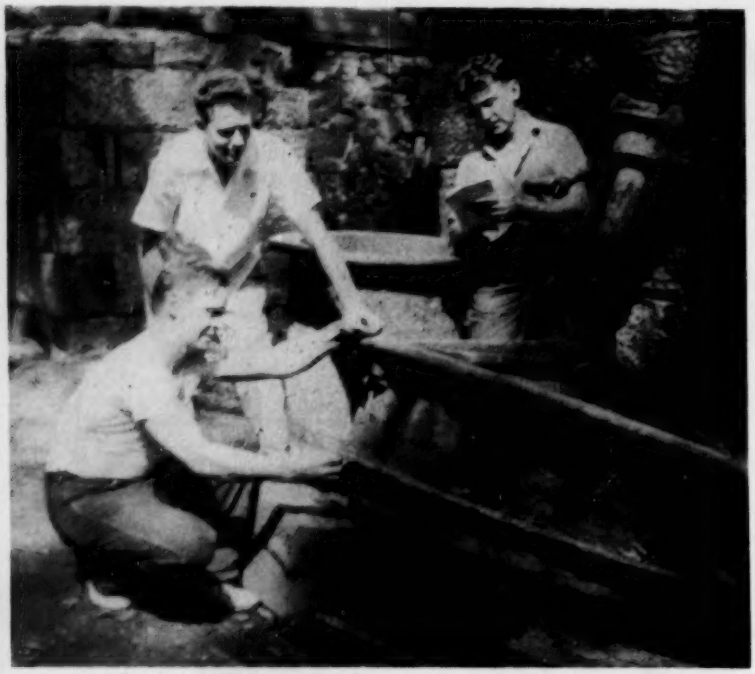
United States Steel offers prompt and efficient service on these chemicals

United States Steel has ten plants producing chemicals. When you order your chemicals from U.S. Steel, you are assured of service and shipment to meet your production needs. For more information, contact our nearest Chemical Sales Office, or the United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

A NEW MOTION PICTURE, "The Waiting Harvest," tells the complete story of the participation of U.S. Steel in the field of chemicals. It is available on request in 16 or 35 mm film from Film Distribution Center, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

USS Chemicals

UNITED STATES STEEL



1880-VINTAGE TURBINE is measured by archaeologists Daniel Hadley, James Akerman and Roland Robbins.

Digging on the Brandywine

Exploratory excavations are under way along the Brandywine River this week—just north of Wilmington, Del.—on the site of the old powder mill (known as the Hagley Yard) where E. I. du Pont started making gunpowder in the early 1880s.

Under the direction of a professional restoration archaeologist, Rowland W. Robbins, early findings include tools and rusted pieces of machinery—which might properly be termed the foundations of one of the world's greatest chemical enterprises.

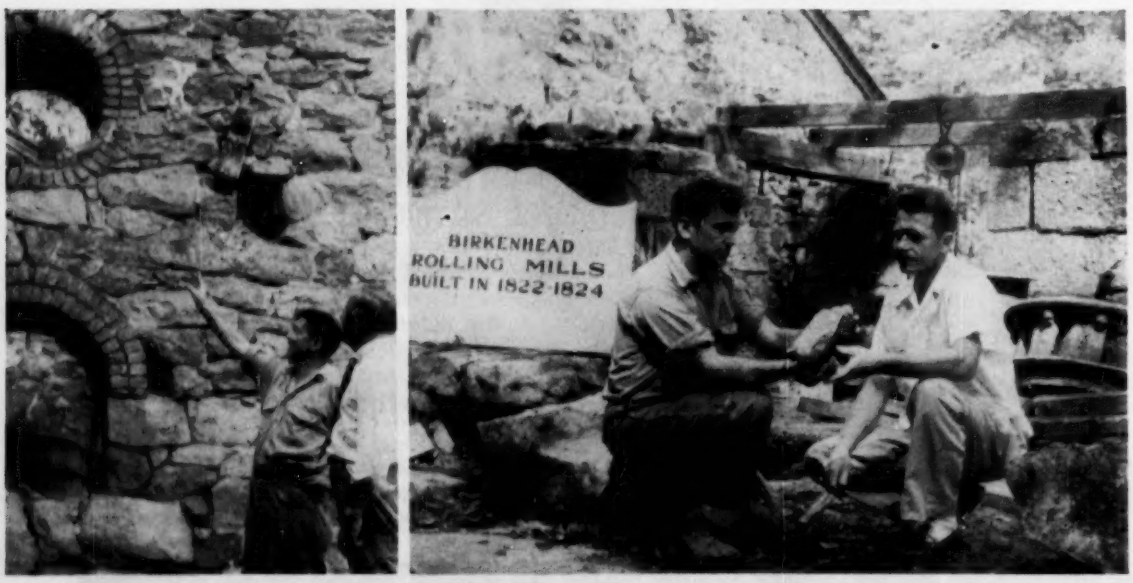
Ultimate Aim: Ultimate aim of the project is restoration of at least one pair of the 22 old rolling mills that once lined the shore of the Brandywine. Working with maintenance crews, Robbins' job will be to remove tons of soil and debris from original foundations, which, at 130 years of age, are believed to be the oldest surviving powder mills in the U.S.

But the job—before it's finished—is apt to be an arduous task at best. Already, removal of tons of rock was required to uncover the tremendous wooden shaft of an original water wheel.

The shaft, diggers estimate, must have been about 2½ ft. in diameter, and its stone supports (when reached) still showed grease marks from lubrication—a century ago.

One of Robbins' earliest problems was to determine the exact location of the great, double wooden water wheel. When last operated (in 1921) the mills were still powered by water, but most wooden equipment had long since been replaced by metal turbines.

Efforts of archaeologists should be well worth the effort, though. For when completely uncovered, the site is sure to become a historic landmark marking the birth of the U.S. chemical process industries.



EXCAVATED RELICS include foundations of Du Pont's original water shed, early dynamite casing fragments.

International MINERALS & CHEMICALS

magnesium oxide PELLETS

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HIGH PURITY

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FOR CATALYST MANUFACTURERS

PETROLEUM REFINERS

GLASS, CERAMIC AND REFRACTORY MANUFACTURERS

METALLURGICAL INDUSTRIES

PELLETS ACTUAL SIZE: 5/8" *diameter;* 3/8" *thick*

International's new Magnesium Oxide Pellets are available in grades with low iron, low boron, low lime, low ignition loss. All are consistently uniform in size and quality.

The extreme high purity of these MgO pellets, up to 99.5%, makes them especially adaptable to industrial processes requiring this basic chemical in a form essentially free from impurities. By producing MgO in this pellet form, we have been able to achieve purities that have never been commercially approached before in carload volume. This makes it possible also to supply, on a custom basis where purity and cost factors permit, a high purity ground product to screen specifications.

One of our several grades may be ideally suited to your requirements as a furnace feed for various electrically fused, high temperature refractory products; in catalysts; for special glass and ceramic products; and for certain metallurgical applications.

With large tonnages available at moderate cost, many industries now using less desirable materials can profitably utilize this chemical in their operations . . . it will pay you to investigate their application to your processes.

For experimental purposes, in any industrial plant, we will furnish adequate samples of International's Magnesium Oxide Pellets.

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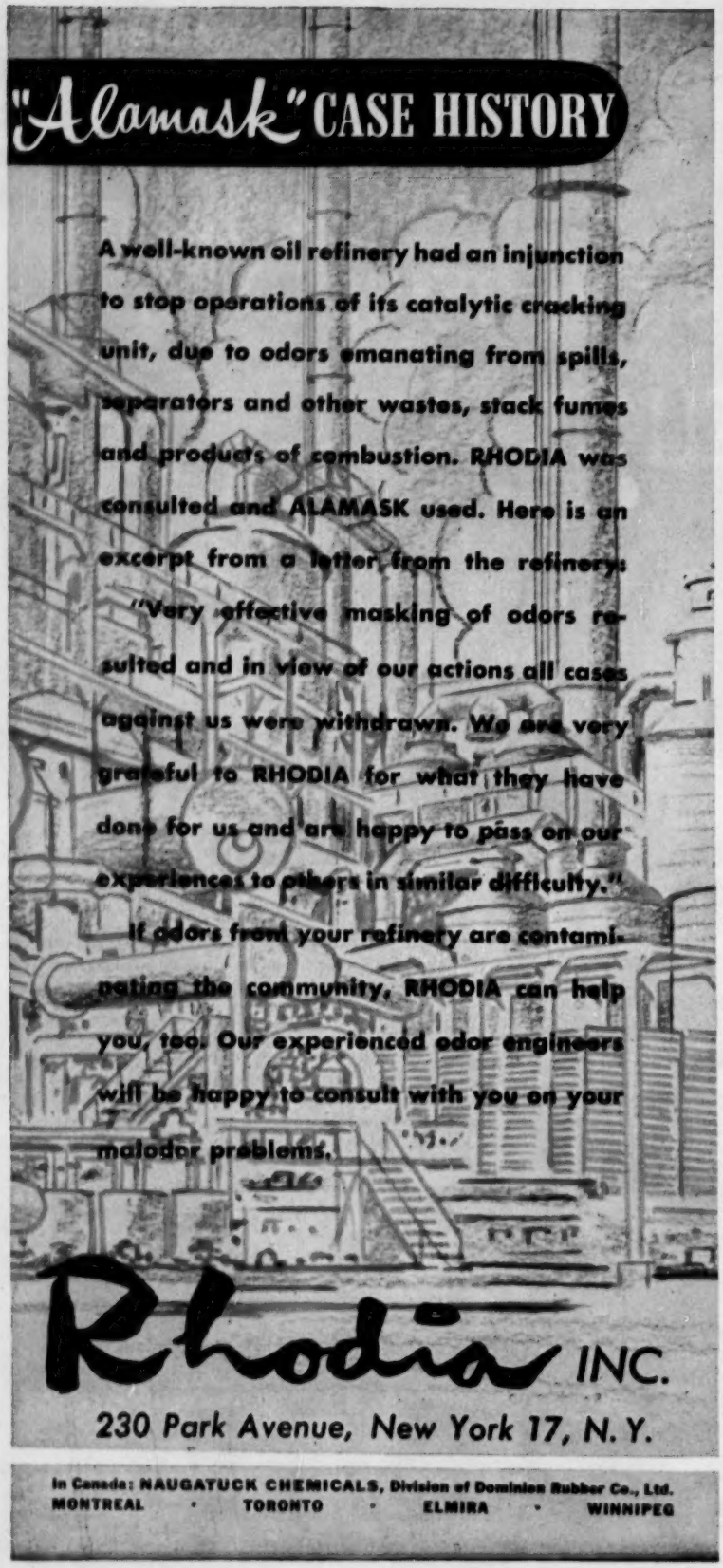
"Alamask" CASE HISTORY
A well-known oil refinery had an injunction to stop operations of its catalytic cracking unit, due to odors emanating from spills, separators and other wastes, stack fumes and products of combustion. RHODIA was consulted and ALAMASK used. Here is an excerpt from a letter from the refinery:
"Very effective masking of odors resulted and in view of our actions all cases against us were withdrawn. We are very grateful to RHODIA for what they have done for us and are happy to pass on our experiences to others in similar difficulty."
If odors from your refinery are contaminating the community, RHODIA can help you, too. Our experienced odor engineers will be happy to consult with you on your malodor problems.
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WIDE WORLD

FLETCHER: For industrial health group, a joint medical-chemical meet.

LABOR. . . . . .

Meeting Season Starts: Almost as many business conferences as football games are scheduled for the next two months; and among the more interesting conclaves for industrial relations people are those of NASS and IHF.

A group meeting for chemical, pharmaceutical and foodstuff company delegates will be a feature of the 13th annual convention of the National Assn. of Suggestion Systems in Cincinnati, Oct. 31 and Nov. 1. Discussion leader will be R. N. Cogger, chairman of Parke, Davis & Co.'s suggestion committee.

An innovation at the 20th annual meeting of the Industrial Health Foundation—whose chairman is Andrew Fletcher, president of St. Joseph Lead—will be a joint medical and chemical-toxicological conference. Keynote address—on economic aspects of industrial health—is to be delivered by A. R. Fisher, president of Johns-Manville Corp.

•

Nonfraternal Relations: For more than a year now, AFL and CIO chemical labor unions have refrained from calling each other names; but there's bad blood between International Chemical Workers Union (AFL) and District 50 of the United Mine Workers. ICWU's executive board recently charged that District 50—which allegedly has been supporting the rebel group that splintered off from ICWU a year ago—was not a "legitimate"

THINGS TO COME...WITH

Glycerine

FABRICS RESISTANT TO CHEMICALS ... *yet with pleasing drape*

There may be good news soon for the working girl who is exposed in the course of her job to corrosive materials. In the past she had to wear heavy protective garments—or else risk damage to her regular clothing.

Now a new coating for nylon fabrics has been developed. It makes these light, attractive fabrics highly resistant—yet they retain their pleasing handle and drape. They also show unusual freedom from cracking or crazing when creased—even at very low temperatures.

This remarkable, patented* film is produced by applying a composition of several organic chemicals, including an organic polyisocyanate and a polyester of *Glycerine*.

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union. District 50's retort is that ICWU is a "do-nothing" union. One recent point of impact: the Inter-Coastal Paint Co. plant in East St. Louis, Ill., whose employees recently switched from ICWU to District 50.

•

Wage Goal Set: Labor unions tend to be more expansive in talking about wage increases these days. Among current developments:

- Atom plant locals of Oil, Chemical & Atomic Workers (CIO) at Oak Ridge, Tenn., Paducah, Ky., and Piketon, O., have notified their employers that a 15¢/hour general increase is the "minimum acceptable."
- One Florida phosphate producer has reached agreement with AFL Chemical Workers this year without a strike. Swift & Co. is granting an 8¢ across-the-board increase plus 2½¢ in other benefits under a one-year contract.
- In general, rubber wages are going up by 12¢/hour. That's the figure already set for 22,000 employees at eight Firestone plants and 15,000 at nine Goodrich plants.

KEY CHANGES. . .

John N. Eustis, to president, Strong Cobb & Company, Inc. (Cleveland).

Robert M. Jackson, to chemical products coordinator, Standard Oil Co. (New Jersey).

G. L. Bridger, to director of agricultural research, Davison Chemical Division, W. R. Grace & Co. (Baltimore).

Thomas M. O'Neil, to vice-president, sales and marketing, Heyden Chemical Corp. (New York).

Joseph F. Patten, to director, Gulf Sulphur Corp. (New York).

Clarence E. Larson, to vice-president, research, National Carbon Co. Division, Union Carbide and Carbon Corp. (New York).

Robert H. Evans, to vice-president and general manager, Forest Products Division, Olin Mathieson Chemical Corp. (New York).

William H. Davis, Jr., to director of sales development, Petro-Tex Chemical Corp. (Houston).

Franklin D. Murphy, to director, Spencer Chemical Co. (Kansas City, Mo.).

DESIGNING ENGINEERS AND CONSTRUCTORS

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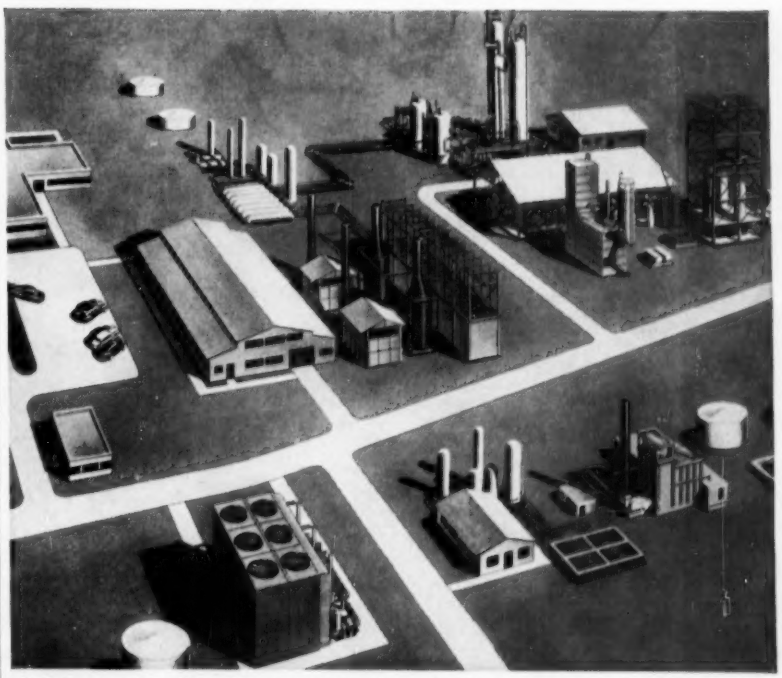
First Complete Ammonia Products Plant Planned For Puerto Rico

Lummus designed unit and will do construction

Construction will begin shortly on a new anhydrous ammonia, sulfuric acid and ammonium sulfate plant at Guanica, Puerto Rico for Gonzalez Chemical Industries, Inc., San Juan. With the creation of this industry, the second largest new endeavor on the island, another milestone is passed in the Puerto Rican Government's industrialization program.

The plant will provide a dependable source of ammonia-nitrogen and related products for fertilizer and industry of the island. This is of particular importance in times of international emergency when shortages may seriously handicap growers of sugar cane, tobacco, coffee and other industrial chemical developments.

Forty-two thousand tons of anhydrous ammonia will be produced per year. Part will be sold as such, and the balance will be converted to aqueous ammonia, sulfuric acid, ammonium sulfate and possibly other materials for use by agriculture and industry.



Artist's conception of complete ammonia products plant for Gonzalez Chemical Industries, Inc., Guanica, Puerto Rico.

This will make the fourth ammonia unit in two years for Lummus. It adds another to the 700-odd plants and installations completed by Lummus throughout the world. May our engineers serve you—at home or overseas?

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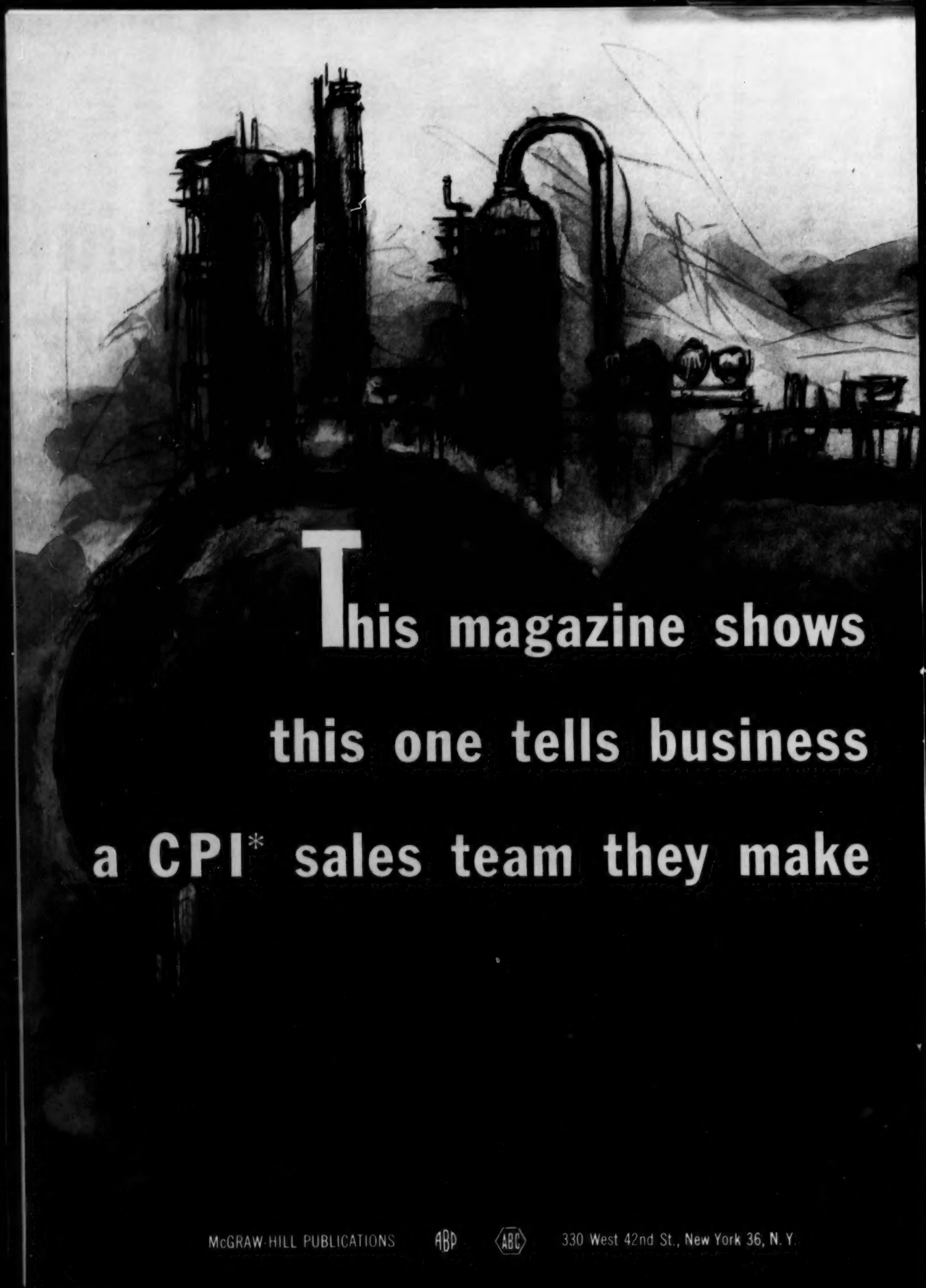
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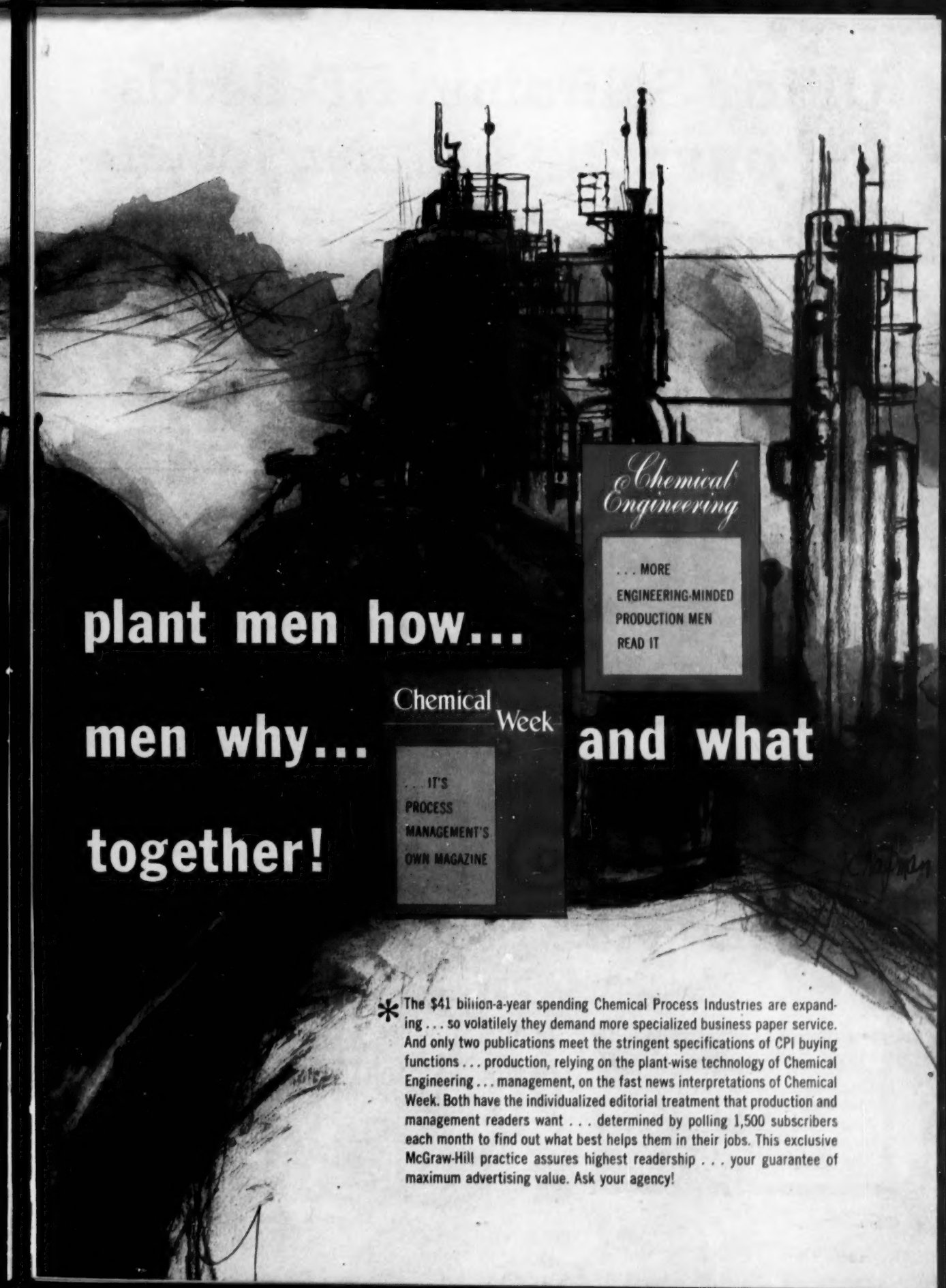

* The $41 billion-a-year spending Chemical Process Industries are expanding . . . so volatilely they demand more specialized business paper service. And only two publications meet the stringent specifications of CPI buying functions . . . production, relying on the plant-wise technology of Chemical Engineering . . . management, on the fast news interpretations of Chemical Week. Both have the individualized editorial treatment that production and management readers want . . . determined by polling 1,500 subscribers each month to find out what best helps them in their jobs. This exclusive McGraw-Hill practice assures highest readership . . . your guarantee of maximum advertising value. Ask your agency!

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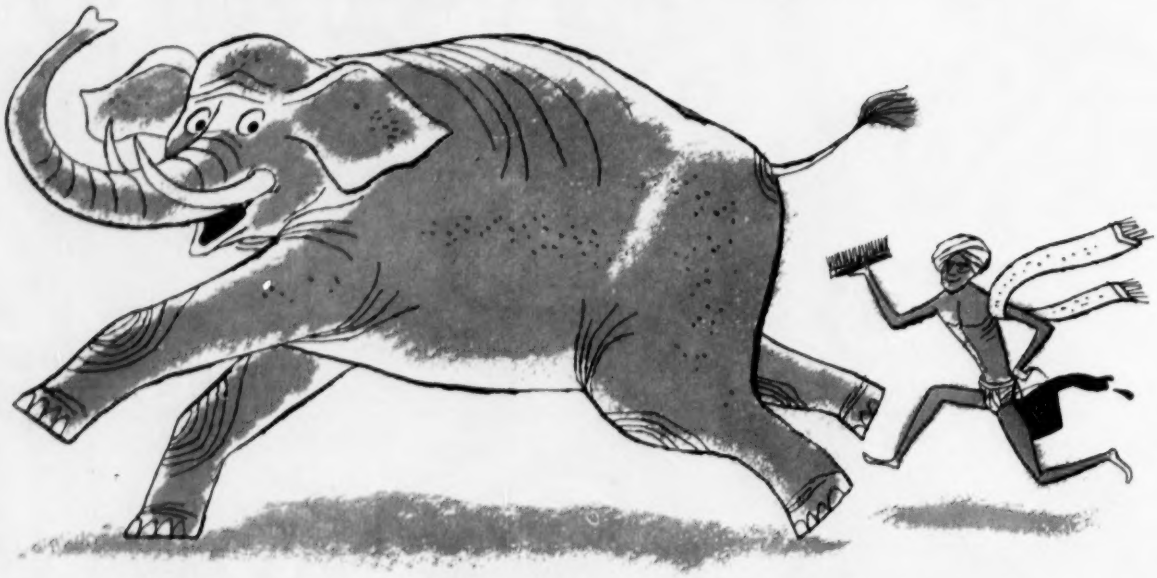

* Well, almost anything. There are still a few things around that we haven't tried them on.

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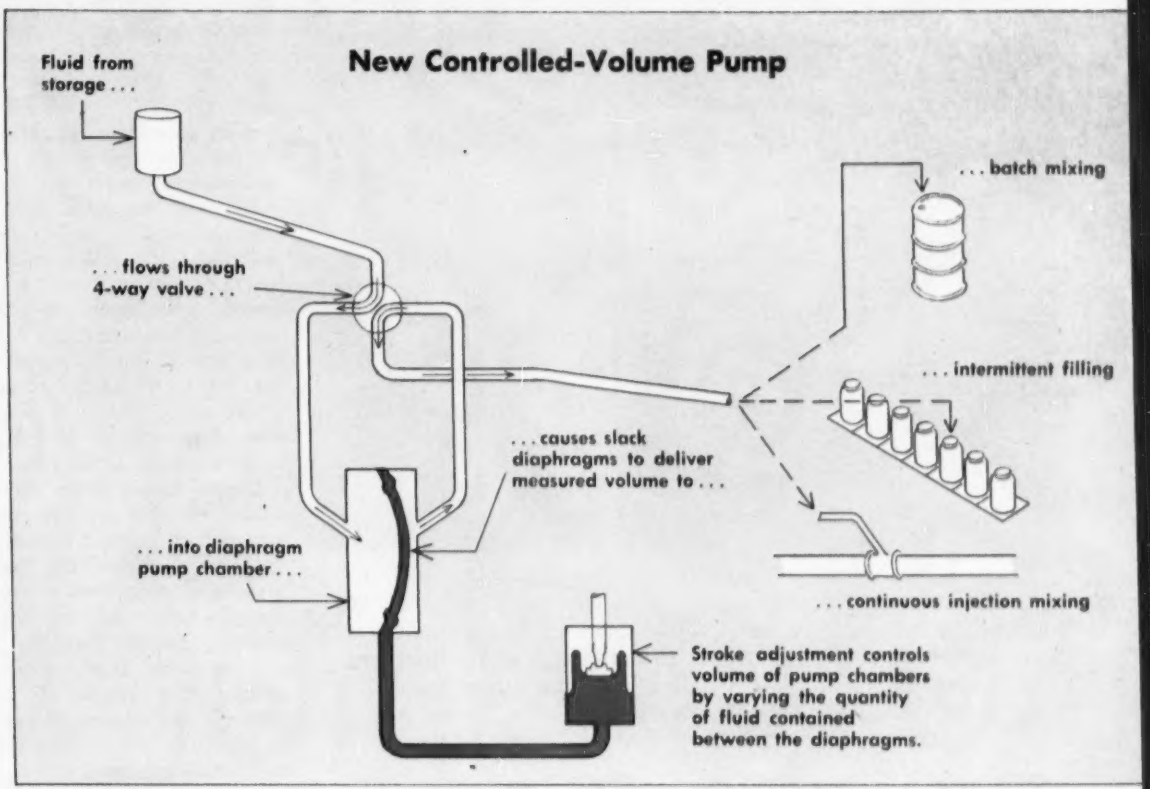
New Controlled-Volume Pump
Fluid from storage . . .
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. . . causes slack diaphragms to deliver measured volume to . . .
. . . batch mixing
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Stroke adjustment controls volume of pump chambers by varying the quantity of fluid contained between the diaphragms.

Downhill Pump: Piston Is the Difference

There's really not much of a trick to performing the operations sketched above. Any one of many controlled-volume pumps now on the market can take an exact amount of fluid and deliver it at a predetermined rate for batch mixing, intermittent filling, continuous injection molding or, in fact, for any of the other hundreds of similar process industry applications. Milton Roy Co. (Philadelphia), however, is out this week with a new controlled-volume pump with an impressive list of qualifications that should make it a strong competitor for a lot of process jobs.

Tagged the Minus Delta P pump, it's built to move fluids "downhill" (to an area of lower pressure). It will give low-capacity flow control in cases where the difference in pressure between inlet and outlet is at least 5 psi.

Keeping It Tight: The new pump works like this: The liquid to be metered flows through a 4-way solenoid valve (*see sketch above*) into the diaphragm pump chamber—either by gravity, centrifugal pump or other pressure-creating device. It exerts pressure on the diaphragm (either neoprene or Tygon), which, in turn, empties the other half of the diaphragm pump chamber. The liquid from the chamber is thus forced through the line.

The solenoid valve then reverses and the liquid flows into the empty side of the diaphragm pump chamber and forces the liquid along through the same outlet line.

Milton Roy's addition to the rather simple principle is the special arrangement of a piston and a "control" liquid inside the diaphragm. By pushing the piston down, more control liquid is pushed into the diaphragm and the quantity of liquid being metered is reduced correspondingly. It's thus possible to control the rate of flow by adjusting the piston stroke.

Since the solenoid also operates on a series of diaphragms, the resulting system is completely closed. And, as Milton Roy is the first to point out, there's no need for stuffing boxes or close-clearance fits.

Presently, the company plans to sell the pump in stock capacities of 3, 15, 75 and 375 ml./stroke—or 1, 5, 25 and 125 gal./hour at 20 strokes/minute. The speed of the stroke is, of course, variable. Accuracy is said to be within 1%.

Standard materials of construction will be Type 316 stainless steel with neoprene or Tygon trim. Therefore, reasons Milton Roy, the only limiting factors on materials that can be metered through its completely sealed system is the corrosion- and temperature-resistance of flexible materials for the diaphragm. If a pump is needed to maintain the needed 5-psi. pressure differential, the firm suggests it can be done and the sealed system kept by putting a "canned" pump in the line. (Its affiliate Chempump is a pioneer in that field.

Producer or engineer, you can make money in foreign markets. But you'll have to play under a completely different set of ground rules. To find out what they are, CW asked Jackson Leonard (above), a man who has tried it.

So You Want to Build a Foreign Plant

Judging by the boom in foreign chemical ventures, it's fairly obvious that construction of overseas plants is attractive to many U.S. firms. But if it's your first time out, you'll have to be prepared to cope with many problems unique to foreign transactions. On the theory that forewarned is forearmed, *CW* last week asked consultant Jackson Leonard for some tips on what to expect when negotiating abroad.

There aren't many problems that would be new to Leonard. As a partner in Brown, Blauvelt & Leonard (New York) for the past year and a half, and as a private consultant for four years, he's worked in most of the European countries, the Near East, and Japan. And his earlier experience (15 years in engineering at three major U.S. chemical plants) qualifies him as an expert in evaluating differences between foreign and U.S. technology. Here, as Leonard sees it, are the major difficulties encountered in foreign engineering projects:

To begin with, overseas dealings are strictly one-man operations. This means that the consultant or representative must assume the initiative and responsibility of making decisions. And he has to do it without the help of numerous experts who are readily available for domestic work.

Preliminary contacts with prospective customers are often made through a cooperating foreign engineering firm. But once the American agent arrives on the scene, he's on his own. To protect technical know-how, the customer usually prefers to use his own people as much as possible, discourages bringing in too many outsiders.

This type of policy is generally satisfactory as far as technicians, engineers, and laborers are concerned. But it can cause severe complications if the customer doesn't have a capable interpreter thoroughly familiar with technical terminology.

The language barrier is the most constant, and potentially the most serious, problem encountered in foreign countries. In Japan, where two vocabularies are used, and in many other countries where numerous dialects are spoken, it's often difficult for consultant and client to reach an understanding in complex discussions.

In many instances, there are no exact language equivalent for highly specialized technical terms. For example, Leonard found it virtually impossible to explain to a Japanese client just how titanium is hydrolyzed from solution. So the American engineer can't rely on pat process definitions alone. He must have a real understanding of the subject in order to get the ideas across clearly.

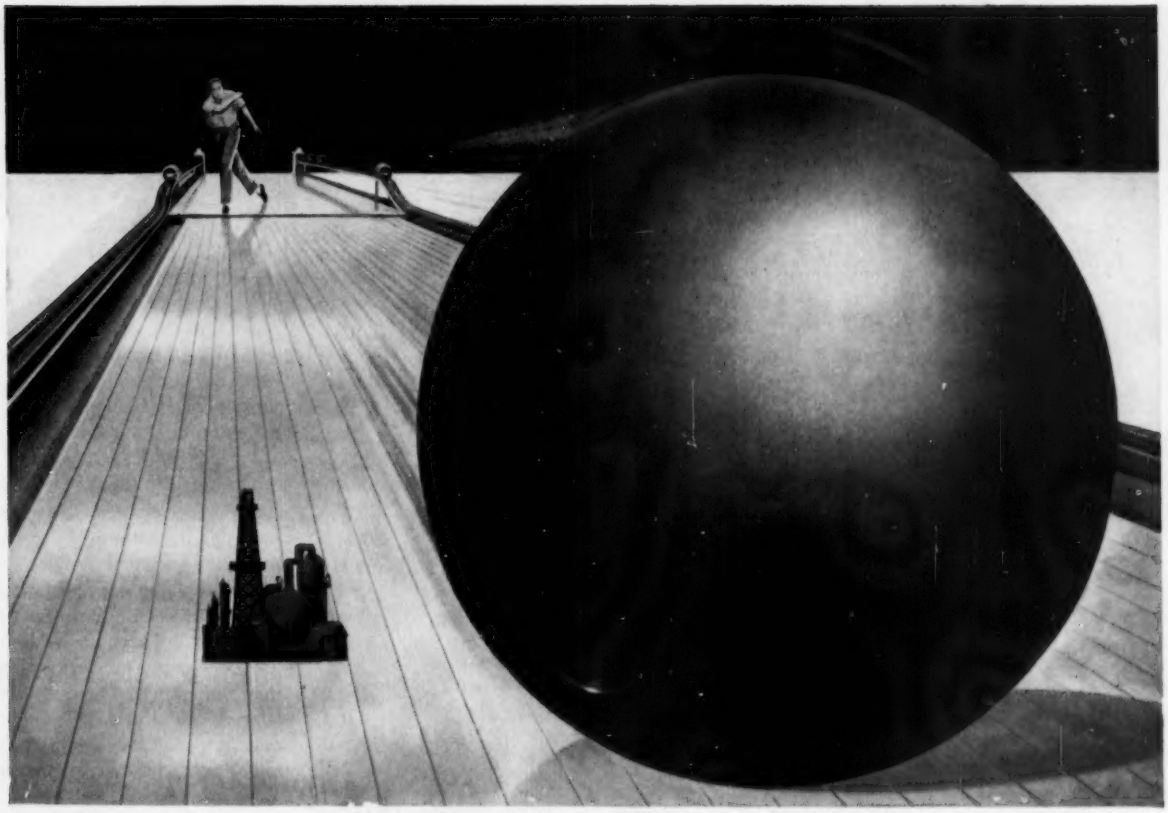
Capital Comes High: Most countries outside of the U.S. are faced with dollar shortages that necessitate rigid credit and financing restrictions. Says Leonard, the Bank of Japan may charge as much as 50% interest on high-risk capital. Even the biggest, well-established firms are commonly charged 15% interest. As a result, processes and equipment must often be drastically revised to pare costs to the absolute minimum.

Under such Spartan economy, many commonplace items become extravagant "gold-plating." For example, automatic temperature recorders at noncritical points—customarily used for convenience in U.S. plants—are vetoed by Japanese manufacturers.

Too, the high cost of investment capital increases a plant's payout period. This factor, coupled with cheaper manual labor, makes it impossible to justify labor-saving devices. A "luxury" item, such as a conveyor, might need a service life of 100 years before it could be considered a practical substitute for five or six men shoveling material by hand.

It's likely that you'll have to make concessions on substitute materials of construction for foreign plants. Many materials, which are plentiful in this country, are scarce and prohibitively priced abroad. On one of Leonard's foreign jobs, straw had to be substituted for relatively high-priced, conventional asbestos block insulation. Cheap labor minimized the cost of applying and mortar-coating the straw by hand. And it proved to be surprisingly efficient as an insulator.

The tight economy also deprives the



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engineer of a comfortable safety factor. He has to be sure that the final design can deliver the goods since plants can't be built with much excess capacity over existing needs.

Procurement Problem: Just about the time that you've learned to live with the major problems, you'll probably begin to notice the smaller ones that cause many minor irritations and difficulties. Differences in foreign equipment, measuring systems, training, and customs may not be too disconcerting individually. But collectively, they can be as troublesome as a swarm of gnats.

" . . . and always anticipate the unexpected."

Training the client's personnel can be especially difficult since teaching methods and basic concepts are not the same in all countries. Too, you may find that even the most capable foreign engineers are, by custom, reluctant to assume responsibilities or take independent action.

From the technical standpoint, it's best to go on the basis of using all U.S. equipment until acceptable foreign products are found to be available. And the best measure of availability and reliability, says Leonard, is past experience. In Japan, for instance, you can find complete duplication of many standard equipment lines, such as filters, pumps, etc. Some of these items are strictly Japanese copies; others are produced under cooperative arrangements with American manufacturers. Several U.S. companies have foreign subsidiaries which turn out fairly complete lines, except for the very latest models and certain critical components.

But it's risky to place business with foreign suppliers who haven't proved their ability to produce the goods. You may get stuck with a piece of inferior equipment, or lose valuable time by having to place a second order with another manufacturer.

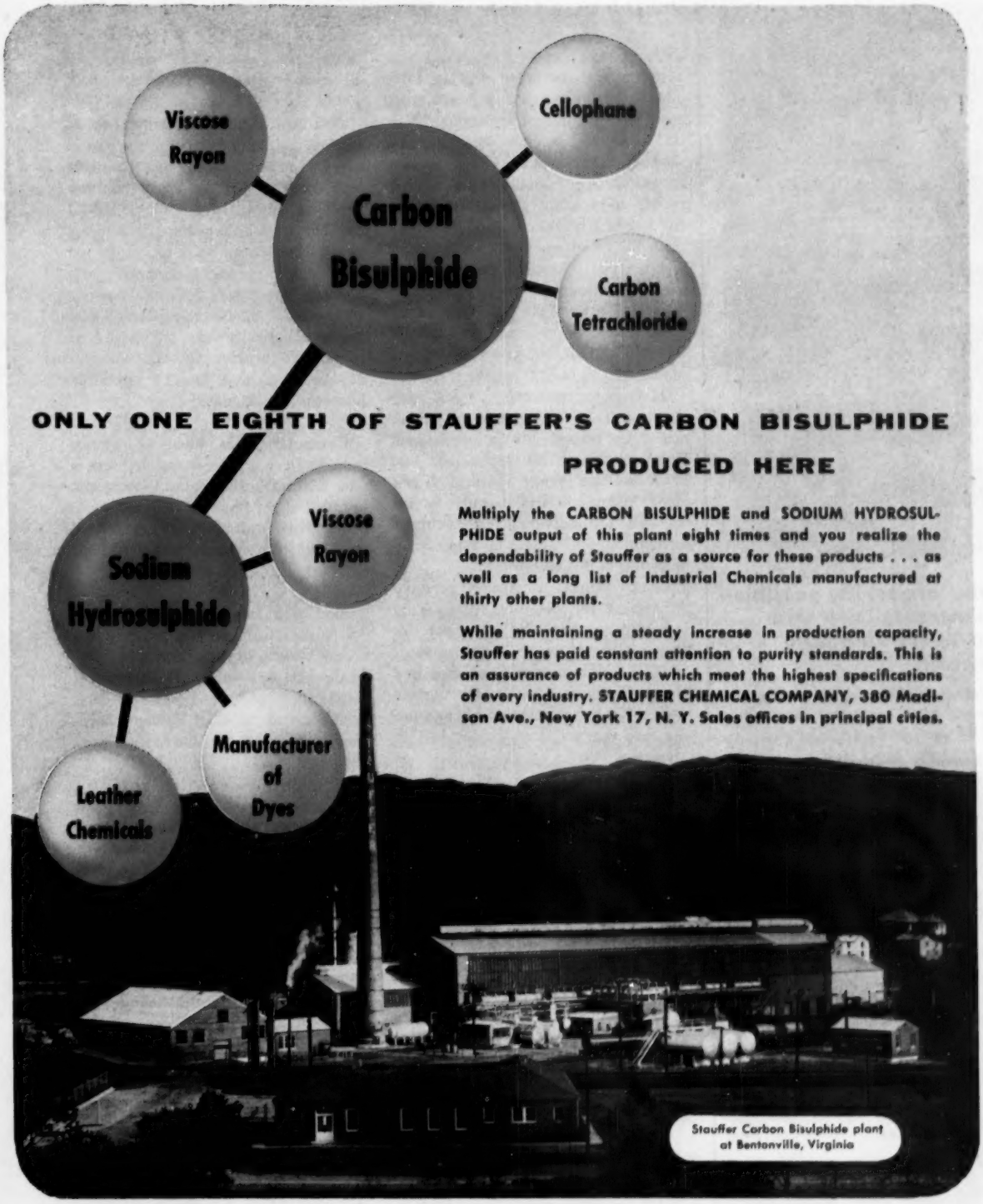
One of the items usually procured from U.S. sources is process instrumentation, especially the newer types of controlling devices. Other items, such as high-pressure chemical feed pumps, specialized types of centrifuges, traveling-screen dryers, etc., are also hard to locate abroad.

As a general rule, U.S. engineering firms have little trouble getting approval of equipment design. U.S. technology is highly regarded in foreign countries, standard ASME codes are recognized and accepted without question. But foreign fabricators may have some difficulty in getting the exact material called for by the specifications. Japanese steel producers, for example, turn out only three standard grades instead of the 25-30 grades readily available in this country. But their best C-grade steel is usually suitable for general applications where high-chromium or extra-low-carbon content is not a rigid requirement.

Expect Red Tape: Don't count on landing a job strictly on the basis of reaching an agreement with the customer. This phase may be only the first, and ultimately the easiest, step of a very tough selling job. For in most foreign countries, there are government restrictions on imports and dollar expenditures.

In Japan, says Leonard, the second selling step involves getting the approval of as many as three government agencies. The first okays dollar allocation for the proposed construction, the second regulates import licenses that may be required for procurement of equipment and materials from sources outside the country. The third agency—a technological evaluation group—decides whether or not the service is necessary, approves only those that aren't available in Japan. It also sees to it that the price is fair and that all other arrangements are in line.

The tight dollar situation limits the fee that can be obtained for design



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and process know-how. And the squeeze will be even tighter after Jan. 1, '56, when new Japanese income tax (58% on corporate income, 80% on personal income and expense money) takes effect. Other foreign countries are contemplating similar moves to provide greater protection for internal producers. But there will probably be easements in special cases where vital technical services are not available within the country.

Is It Worth While? In view of all these problems, you may well ask: is it worth all that trouble? Leonard and others who've tried it believe it is.

Though the monetary return may be modest by U.S. standards, there are other rewards to be considered. For one thing, U.S. techniques and know-how are greatly appreciated and highly regarded. And, because of his key role, the individual receives more recognition and honor in Japan than he would in this country.

Leonard has a strong personal preference for chemical projects in Japan. Says he: "Its chemical industry is highly active—as a result of our (U.S.) influence, it's organized along familiar lines." His current interest lies in petrochemical expansion —a field that's still wide open in that country.

Taking an over-all view of the foreign construction picture, Leonard derives considerable personal satisfaction from the belief that American technical assistance to overseas producers may be the long-range answer to better international relations.

Their plentiful dollars and abundant resources give American producers an upper hand in a seller's market. But this can do more harm than good, cautions Leonard, if it results in U.S. foreign-aid dollars' being channeled back to whence they came. And it can easily generate envy and ill will on the part of less fortunate foreign competitors.

A good rule to go by, says Leonard, is to observe local customs, deal with modesty and respect, and always anticipate the unexpected.

EQUIPMENT . . .

Gas Dryer: Industrol Corp. (Roselle Park, N.J.) is out with a Midget Dryer, said to provide dependable, low-cost drying for compressed gas systems. Available in three sizes, the completely automatic units utilize an electrically regenerated solid desiccant.

•

Nitrogen Seal: James-Pond-Clark (Pasadena, Cal.) has come up with a new line of couplers to meet the growing demand for nitrogen solution handling equipment. Circle Seal couplers were designed specifically for liquid fertilizer applications, to provide efficient transfer and high-speed filling of tanks from top or bottom. Coupling arrangement features a filler valve that automatically shuts off when connection is broken and an antidrip device to prevent loss of ammonia from the disconnected hose.

•

Computer Add: Final acceptance tests were recently completed on a new $200,000 ElectroData computer installed at the Shell Development Co. (Emeryville, Calif.). A medium-speed machine, it can multiply two 10-digit numbers, 100 times a second.

•

Indicating Integrator: Fischer and Porter (Hatboro, Pa.) is bringing out a new system that integrates and indicates the total flow of each of a number of process points. It can handle up to 20 total flow measurements on a single central station control panel.

•

Dry Sampler: Denver Equipment Co. (Denver, O.) has a new Vezin-type dry sampler that's said to eliminate the dust problem in many sampling operations. It's sealed with gaskets to prevent passage of dust outside; the electrical circuit, motor or mechanism is protected from the dust. The sampler was developed for a cement manufacturer who had a dust problem in sampling fines.

•

Plastic Instruments: Now there can be plastic instruments as a result of new fittings of unplasticized polyvinyl chloride and tubing of flexible material made by Tube Turns Plastics, Inc. (Louisville, Ky.). The company reasons like this: In the past instrument makers steered clear of pneumatic instrumentation because of the need for metal fittings and tubes. Instead, they concentrated on electrical instrumentations. Pneumatic instrumentation assembled with PVC fittings and flexible tubings, it says, "is the most economical by a considerable margin."

Advances in Applied Radiation

DEVELOPMENTS in the FIELD OF APPLIED RADIATION ENERGY, its APPLICATIONS and the APPARATUS USED TO PRODUCE IT

High Voltage Opens West Coast Office

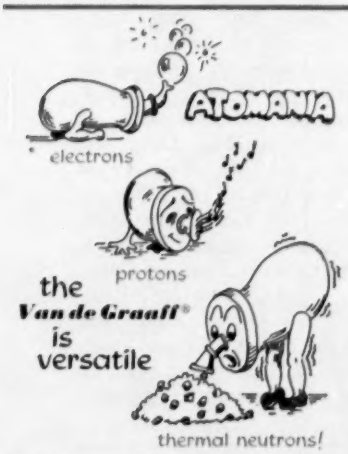
To handle sales and to provide service to customers in the Western part of the country, High Voltage has established a West Coast office at 1644 Grove Street, Berkeley, California. Manager of this new activity, which will also engage in the development of advanced accelerator systems and components, is George C. McFarland, for the past nine years a physicist at the Radiation Laboratory, University of California. Associated with him will be a group of physicists and other scientists having extensive experience in particle-accelerator design and construction.

High Voltage, the only commercial builder of Van de Graaff accelerators, has recently announced a newly developed line of microwave linear accelerators. Both types of machines produce intense beams of radiation which have wide application in industrial radiography, chemical processing, "cold" sterilization, medical therapy, and nuclear research. Many industries of the West — aircraft, chemicals, oil, rubber, plastics, and shipbuilding — have use for such particle accelerators and can now be served directly by High Voltage's new office.

Middle East's First Accelerator

The Weizmann Institute of Science in Rehovoth, Israel, has ordered from High Voltage a 3-million-volt Van de Graaff positive-ion accelerator for use in a program of atomic energy development now being carried on by that country. The machine will be the first "atom smasher" in the Middle East.

Dr. Amos de-Shalit, head of the Institute's physics department, plans to use the accelerator in the study of nuclear reactions produced by the bombardment of nuclei with high-energy protons. So used, Dr. de-Shalit says, the machine will contribute substantially to his nation's atomic research program.



Shell Buys Powerful Accelerator

Shell Development Company has just purchased from High Voltage a 3-million-volt Van de Graaff electron accelerator for radiation processing. This machine — the most powerful radiation source available to industry — is to be installed at Shell Development's Emeryville, California, laboratories. Shell scientists will use the accelerator in studying the effects of radiation on fuels, lubricants, plastics, and other oil-derived materials. The program will be aimed at learning more about changes that take place in matter exposed to high-energy radiation. Such information could lead to the creation of entirely new products, Shell's experts believe.

Prime advantage of this new accelerator is the extreme intensity of its radiation field. This intensity is several hundred times that of the most powerful radioactive cobalt source (4000 curies) now used by industry, or of any proposed for industrial radiation in the future. *In fact, this machine can process more product per unit of time than could the combined outputs of all the radioactive sources in the United States.* Shell's scientists state that the unit can treat more plastic in one hour than other radiation processes can in twenty days.

Other features are its easy adaptability to continuous, or conveyor-system, production techniques and the fact that it presents no radiation hazard when it is turned off. This new accelerator, which will cost about $117,000, will be delivered early in 1956.

Shell Development also has a 2-MeV positive-ion Van de Graaff installed in its Houston laboratory. Researchers there use the machine in "aging" rocks atomically — by bombarding them with protons, producing in one week, they say, the amount of radioactivity to which a rock might have been exposed during ten million years, in nature. Such studies as these can help scientists determine the age of rock formations and thus provide new clues in the search for oil.

Shell's 3-MeV Accelerator

Six-Mev Van De Graaff to Columbia

The huge six-million-volt Van de Graaff particle accelerator purchased by the U. S. Atomic Energy Commission for installation at Columbia University in New York recently passed all of the rigid factory tests required by High Voltage, and shipment to Columbia was completed in August.

The accelerator will be used primarily in the measurement of basic nuclear properties and neutron cross-sections.

Spain to Study Light Nuclei

The Junta de Energia Nuclear of Spain has received its 2-million-volt Van de Graaff positive-ion accelerator from High Voltage. It is to be used in a study of light nuclei, under the direction of Dr. Carlos Sanchez del Rio. The machine is located at the Centro Nacional de Engergia de la Moncloa.

HIGH VOLTAGE ENGINEERING CORPORATION

47 UNIVERSITY ROAD CAMBRIDGE 38, MASSACHUSETTS

New! DOCTOR'S DEODORANT DISCOVERY
ONE POOF... IS ALL THE PROOF YOU NEED!
Are you sure you don't need a man's deodorant?
WHY use 2 or 3 deodorants to stop body odors—bad breath? nullo stops them all!
a NEW KIND of deodorant!
New MUM cream deodorant
New! A greaseless anti-perspirant that lets your skin "breathe"
Is there an air of freshness about you?
...are you really lovely to love?
More effective than creams! Easier to apply than sprays!
rolls on
Stopette
Now! a deodorant that ends acid-damage to skin and clothes
MENNEN Spray Deodorant FOR MEN
FRESH girl is always lovely to love
ban

FIGHTING WORDS: Still telling us what our best friends won't, ads reflect hot competition among deodorant makers.

The Deodorant Battle: Form vs. Formula

Whether they need it or not, 85% of women, over 40% of men use a personal deodorant, as often as not a cream.

Easier application, goal of the battle of forms and new packages, may determine who will pull the plum from the $62-million-plus deodorant pie.

But the products themselves could be due for improvements, too—better antiperspirant activity, more efficient deodorants. Possibility: use of ion-exchange resins.

There's been a new look in personal deodorant advertising this summer. Less prominent is the familiar "even your best friends won't tell you" approach that sells people on the general idea of deodorants. Taking its place is a bevy of highly competitive campaigns stressing the differences between brands.

As they move out of the pioneer stage into the hard fight for a 65% saturated market* (85% of women use a deodorant, but there is still room for converts among men: only 40% are users), deodorant makers are choosing their weapons among easier-to-use combinations of packages and forms. Talk hummed through the lobby at the Society of Cosmetic Chemists' deodorant seminar this month about the advantages and problems of liquids vs. creams vs. sticks vs. powder vs. pads (and particularly vs. Brystol-Myers' new "ball-point" package). The talk, whether in French, German, or English, was excited and concerned big money. The deodorant market has been conservatively estimated at $62 million/year (but other guesses go up to $75 million and even $94 million).

On the Shelf: There are about 300 different brands being sold, but 85% of the business is done by the top 15 labels (competition for limited supermarket shelf space makes it difficult for many small brands to compete). The biggest four seem to be Stopette** (Jules Montonier, Inc., Chicago), Mennen's (The Mennen Co., Morristown, N.J.), Mum (Brystol-Myers Co., New York), and Arrid (Carter Products Inc., New York).

Of these, Mum and Arrid are creams, a form that's getting a declining percentage of the market, although actual sales are climbing (in 1947 creams had 85-90% of a $24-million market, but now they are down to 60% or less). Other big-selling creams are Tussy (Lehn & Fink Products, New York), Fresh (Pharma-Craft Corp., New York), Veto (Colgate-Palmolive Co., Jersey City, N.J.), Odo-Ro-No (Warren, Northam Corp., Stamford, Conn.), Ever-Dry (Ever-Dry Corp., Los Angeles, Calif.) and Etiquet (Lehn & Fink). Creams usually have sizes at 25¢, 40¢ and 60¢.

Stopette and Mennen's are polyeth-

* It hasn't been many years that more than a few men could be persuaded to use deodorants at all. Clever psychology finally broke their resistance (example: Mum's slogan, "For *Active* Men," Mennen's "Are you sure you don't need a *man's* deodorant?"). The Mennen campaign is based on the company's long-time successful premise: that men will do almost anything to avoid using a woman's toiletry, but women have no such strong resistance against a man's product. Mennen figures that if they get a bottle of their deodorant into the home, the whole family will use it.

** Indicative of what breeds success: Stopette has spent as much as 65% of its receipts on advertising.

ylene-bottled liquids. Liquids, the oldest form (pioneered by Odo-Ro-No early in the century), were set back considerably when creams came in during the late '30s, but had a spectacular rebirth when they were put in the squeeze bottles eight years ago. Although down a little now, at one time they had one-third of the business. Additional big sprays include Avon (Avon Products, Inc., New York), Heed (Pharma-Craft), Odo-Ro-No and Veto. There are usually two sizes for sprays: 60¢ and $1.

Getting on With It: Another big comeback is now being made by sticks (first introduced 1934-37, but due to poor formulations they melted, evaporated or were sticky). Now greatly improved, they are looked to by many as a good compromise between creams and sprays (creams are generally considered more effective, partly because they stick better, but are messy to use; sprays are easier to apply, but tend to be drippy). Pushed as a happy medium, sticks are climbing back, have now, claims one maker, taken 20% of the market. Some of the prominent sticks are Sutton (Sutton Cosmetics Inc., New York), Old Spice (Shulton, Inc., New York), Fresh, Tussy, Etiquet. Sticks are priced at 70¢-$1.25.

Two new methods of eliminating messiness from application now have the industry's attention:

Brystol-Myers' new Ban is a lotion in a new kind of bottle-applicator, patterned after the ball-point pen (and which is catching the eye of other specialty makers with application problems). The deodorant is picked up by a free-rolling polystyrene ball, which rolls it on the skin. This allows a more viscous formulation than sprays (which tend to drip), and doesn't grease the fingers, as does the use of cream. Another approach to the same problem is Key Deodorant Cream (General Cosmetic Corp., Chicago)—a cream in a polyethylene tube with a convex perforated head. Squeezing the tube brings the cream out on the head, from which it can be applied. Each of these retails at $1.

What's Inside? Although outside the auditorium at the SCC seminar the talk was about packages, inside it was about ingredients and effects. Many preparations are simply deodorants (for example: Mum, most sticks), but many others offer an additional effect—a decrease in perspiration. This antiperspirant effect is controversial: nobody agrees on just how it works, some don't even agree that it does work (most do agree that work in antiperspirants hasn't been as successful as that in deodorants). Best opinion seems to be that astringent salts contained in the preparations cause a mild inflammation of the skin, which closes or partly closes the sweat ducts.

The astringent salt, usually an aluminum salt (aluminum chloride, aluminum sulfate, aluminum chlorohydroxide), also carries most of the deodorant load (also often used in straight deodorants: hexachlorophene). Odor, it has been found, stems from the slight amount of sweat produced by the apocrine glands (found only in certain areas of body, most concentrated in the axilla). Contaminated with ordinary surface bacterial flora, the apocrine sweat (in itself sterile and odorless) develops its characteristic odor.† Ordinary sweat (eccrine) has little to do with it, except that it helps provide the right kind of humid climate for bacterial growth.

By forming a low-pH acid, the aluminum salt kills this bacteria and the odor. Just to make sure of the latter, most preparations also include a perfume, although some believe that this should be kept to a minimum because of the possibility of irritation.

If and when the battle of packages and forms settles down, researchers may be ready with new ingredients. The hottest new idea discussed at the SCC seminar was the possibility of using ion-exchange resins—a combination of anionic (to take away acidic constituents of perspiration) and cationic (to absorb ammonia and organic amines formed by the decomposition of the amino acids). With ever-better packaging and with big improvements still to be made in the formulations, you can look for a lot more shifting of the market before a clear-cut victor arises.

† Not everybody has underarm odor. Nobody has it until the apocrine glands develop at puberty, and some never get it (those that do, vary widely in intensity of odor, not only from person to person, but from day to day with the same person). Whole races are exempt—it is so uncommon in Japan that having underarm odor is ground for being rejected by the Army.

NEWPORT

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Staley's

EGG FRYING: 'Over easy' is easier with a new silicone skillet treatment.

No Need for Grease

Modern dishwashing detergents are good—witness their booming sales. But no wash product can make the chore of scrubbing pots and pans with burned-on food easy, and more than one specialty maker has sought a way to prevent greases and fried foods from sticking to pans.

Latest firm to market an antistick treatment is Selinized Process Co. (Omaha, Neb.) with its Selinizing. The firm, expecting to market its own brand of kitchen utensils last week, has since changed plans, is now offering its treatment (done in the firm's plant) to other makers of kitchenware.

The new process is the latest attempt to bring the advantages of permanent silicone treatment (a treatment typified by Dow Corning's patented Pan Glaze, for bakery pans) to the housewife. And it is touted to give makers of aluminumware the best talking point yet for battling sales of stainless steel ware.

According to the firm's spokesmen, Selinized utensils are permanently protected from discoloration, corrosion and pitting. S. A. Seline and his son, who devised the process, say that foods may be fried, boiled or baked in the pans without fear of sticking—greasing is needed only to impart flavor.

And the treatment isn't expensive: although exact prices have not been worked out, it is estimated that the treatment shouldn't boost the cost of a typical utensil more than half a dollar (although this will, of course, be at the discretion of the distributor).

Custom-coated: According to present plans, the patent-applied-for treatment will be done only at the firm's Omaha plant. Essentially, it involves application of the special silicone, and baking it on at about 600-800 F. Although aluminumware is being processed first, the techniques can also be used, the firm says, with stainless steel and porcelainware. Commercial utensils (like bread pans) can also be treated.

Another application showing promise: coating the interiors of ovens so that spills from pies, roasts, etc., will be simple to remove. Norge has run limited trials with it for this purpose, and Sunbeam, too, is said to have experimented with it.

Seline believes the coating will last the lifetime of the utensils, providing they are properly handled. The coating can be damaged, the firm admits, by scouring or by scratching with a spatula. (This is true of most treatments so far developed.)

The possible damage caused by

AMMONIA PRODUCTION AT GRACE CHEMICAL

goes "OVER THE TOP"

with exclusive FW Sequence

The above curve shows average monthly output of liquid anhydrous ammonia at the new Grace Chemical Company plant in Memphis, Tenn.

From "on stream" to full capacity production, on the basis of monthly averages, was achieved within 3½ months—a short period of time for a completely new plant. On a *daily* basis, full production was actually exceeded within 30 days from start-up. And the average monthly production, 90 days later, was *well above* the rated plant capacity.

This demonstrates the ease and rapidity with which the FW sequence for ammonia synthesis can be put on stream and raised to full production capacity, and proves the efficient functioning of all elements of the system—Texaco partial oxidation, FW liquid nitrogen wash and Casale ammonia synthesis.

For complete information on this Grace plant installation, send for the Mar.-April 1955 issue of "Heat Engineering." *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

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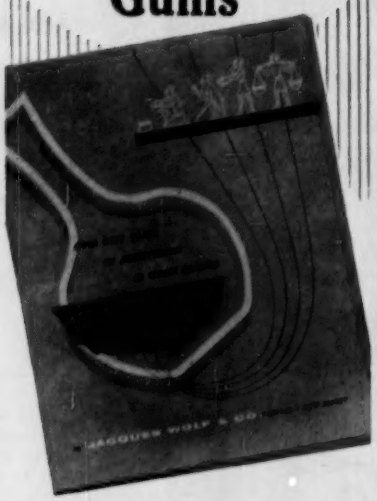
FASCINATING BOOKLET

"The Story of Water Soluble Gums"



From strange and exotic countries come the natural gums which are in greatest demand in modern America. Gum Arabic, Tragacanth, Karaya, Irish Moss, and Locust Bean . . . some transported half way around the world to you by Jacques Wolf & Company, direct importers of gums for over 50 years.

The fascinating story of the history, characteristics, and uses of these famous gums is presented in the booklet "The Story of Water Soluble Gums". Jacques Wolf & Company is happy to again offer this booklet as a service to all users of chemicals without obligation.

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scratching might be eliminated by some sort of applied-before-each-use compound, and it is no secret in the trade that at least one such product (a readily applied, one-use silicone) is in the works.

So far, the patent situation on silicones for food utensils hasn't been completely brought to light. Dow Corning has extensive, broad-range patents in the field (U.S. Pat. 2,606,-510; 2,672,104-5); Paul Webb and John Koster, too, have done work along this line (U.S. Pat. 2,470,593, 2,462,242). But however the patent situation is worked out, the home dishwasher stands to gain.

Keeping the Edge

If there's one thing that seems plain in the field of special metal cutting coolants and lubricants, it is that there are almost as many individual formulations as there are machine tools. Most of the oil companies offer special cutting oils; many tool firms sell their own materials.

Motch & Merryweather Machinery Co. (Cleveland), producer of circular saws and milling cutters, is the latest firm to back a cutting fluid. Triple Cut, as the new material is tagged, is a product of Pro-Chem, Inc. (also of Cleveland) and will soon be marketed through M&M outlets.

The advantages claimed for the new coolant: permits much longer tool operation than conventional fluids; gives good service under extreme pressure conditions; competes (at about $4.50/gal. to be mixed with 20 parts water) with other lubes; is nonirritating to the skin.

METAL CUTTING: For fewer tool changes, better cutting—a new coolant.

No Mixture: Donald Brillhart, a chemist, devised the fluid with the backing of a few school friends. His firm, Pro-Chem (now consisting of only Brillhart and a patent lawyer friend), is currently making another wet coolant for M&M grinding tools. About his latest product, Brillhart says only that it isn't a mixture of components, as are most water-base cutting fluids.

Right now, since the product isn't on the market, M&M is trying to find firms to test it. M&M will supply a sample free to any firm willing to give a detailed report on the fluid's performance. Reason for the extra background researches: preliminary trials indicate that a tool good for 1,000 pieces when used with conventional fluids could produce 8,900 when protected with Triple Cut. And even M&M is reluctant to believe its product is quite that spectacular.

From Ground Up

It's not every plant that gets off to a roaring start like Costa Rica's newest (and first) agricultural chemical mixing plant, Quimicas Agricolas Centroamericanas, Ltd.

Besides being the first—and only—such plant there, it is located handy to a first-grade clay diluent source, has rail and road transportation, modern equipment by any standards, and operates with a strong tax advantage (all finished insecticide materials imported to Costa Rica have a 15% tax levied on them)*.

The upshot of this combination of factors has been lusty sales for the new firm. Already the peak capacity of 150 tons/week has been approached at the plant, and it has been open only since June 1.

Good Planning: Channing Frederickson, with 15 year's experience in Central America as an American salesman of pesticides, and Victor Manual Yglesias operate the privately financed, $350,000 plant. They figure it isn't a matter of luck that the plant enjoys the advantages it does.

The location, 15 miles from San

* The firm pays a 2% import tax on technical-grade materials, rather than the 15% ad valorem tax, gaining a 13% advantage.

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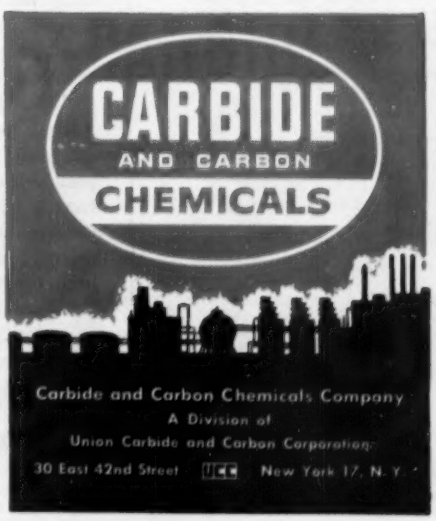

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The Traveletter System builds morale in your sales force and increases its efficiency — eliminates all "self-financing." At the same time it simplifies home office accounting, reduces cash advances, ends the need for expense checks, gives you greater control over travel expenses.

This foolproof, efficient system of getting money to your men in the field has been used by American Industry — large and small — for over 60 years. Its renewal rate among users is greater than 96.5% — what better proof of its value could there be! Here's a sampling of those users:

Chance Vought, Inc.
Diamond Crystal Salt Co.
Electric Auto-Lite Co.
Electricooker Div., General Foods Corp.
Esterbrook Pen Co.
Gerber Products Co.
Leeds & Northrup Co.
Minneapolis-Honeywell Regulator Co.
New England Confectionery Co.
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If you regularly send money to men in the field — even to as few as ten — write for our fully descriptive brochure. Discover how Traveletter will save money and make money for your company. Traveletter Corp., Greenwich, Conn.

TRAVELETTER
SINCE 1894

Jose in the village of San Antonio de Belen, was chosen largely because of its nearness to a grit-free, highly adsorptive clay known as Ricaclay that can be trucked directly to the plant, processed just before inclusion in formulations.

Too, the plant has the services of a rail spur, convenience to the Inter-American Highway, and is even handy to Costa Rica's new international airport.

With a Raymond roller mill capable of turning out 25,000 lbs. of dust and wettable powder per eight-hour shift, and stainless steel mixing tanks with a 3,000 to 4,000-gal./shift capacity. Fredrickson figures that the firm can produce any pesticide the land's broad variety of crops might demand—major crops include coffee, cacao, bananas. The nation purchased finished insecticides valued at $0.75 million last year.

Location and equipment make it possible, Fredrickson says, for him to give virtually immediate delivery on necessary insecticides. Imported material often took months to arrive, was of little help in cases of sudden insect infestations.

Among the potential customers for the firm is the vast United Fruit Co. Although Quimicas Agricolas Centroamericanas now has its sights set only for the Costa Rica market, it makes no secret that it has hopes for contracts with United for the whole Central American area.

Upping the Ante

Winton Rankin (assistant to the commissioner, Food & Drug Administration) gave the hint to the National Agricultural Chemicals Assn. last month, when he brought out how fees for establishing pesticide tolerances weren't covering expenses (*CW, Sept. 24, p. 92*). Now, FDA has made a positive move. It is going to boost the fees it charges pesticide makers for the establishment of a tolerance for the material when used on raw agricultural products (excess to be rebated).

Where FDA charged a $500 minimum to set a tolerance under the Miller pesticide amendment, it will demand a $1,000 deposit beginning Oct. 17. This deposit would be increased by $100 for each commodity above the first nine on which tolerances were requested.

If a maker asks two or more different numerical tolerances, he must supply a $1,500 deposit. In this case, an additional $100 deposit is required for each commodity over 14.

Details on other miscellaneous charges set by Food & Drug for use when a maker withdraws a tolerance request, submits additional information, or for other such actions, appear on p. 6928 of the Sept. 16 *Federal Register*.

•

Tire Foam: National Chemical Laboratories, Inc. (West Palm Beach, Fla.) is now marketing an aerosol white-sidewall cleaner for tires. The specialty, a foam detergent, is packed in a 12-oz. Crown Spra-Tainer, equipped with a Precision valve. One can of Aero-Wite (98¢) is said to clean several sets of tires.

•

Double Crinkle: Latex paint over oleoresinous paint is the basis for a new crackle finish devised by Sherwin-Williams' Ray Hookway (U.S. Pat. 2,714,560). For porous surfaces, the process consists of undercoating with a moderately slow drying oleoresinous film former. While this is still tacky, a latex water emulsion paint is applied in nonuniform thickness, and the combination film allowed to dry.

•

Beauty Parade: The Chemical Specialties Manufacturers Assn. (New York) will accept entries for its 4th annual aerosol contest through Oct. 15. Entries will be judged by classification (insecticide, insect repellent, glass cleaners, shave products, pharmaceutical items, etc.) on the basis of general sales appeal. Awards will be made at the CSMA annual meeting, Roosevelt Hotel, New York, Dec. 5-7.

•

Red Splice: For splicing rolls of paper at the printing press, a new adhesive, colored red for quick spotting, is being sold by B. F. Goodrich Co. (Akron, O.). Says Goodrich: it won't soak through paper, needs no diluting, won't evaporate.

•

Antifly Combo: Take lindane, add a combination of two parts 2-nitro-1,1-bis (*p*-chlorophenyl) butane to one part of 2-nitro-1,1-bis (*p*-chlorophenyl) propane, and you've got an exceptionally effective synergized insecticide, according to California Spray Chemical's James Hansen (U.S. Pat. 2,714,572).

PROVED PERFORMER

This mass of rubber and steel is a fine example of early automotive design, and is still in running condition today, almost half a century after it was built. It is an antique Cadillac touring car de luxe of the duster and goggles era.

Esso Petroleum Solvents have had the same test of time, and like the Cadillac, have built a fine reputation for superior quality and unfailing dependability. Why not get the highest quality next time you order? Specify Esso Petroleum Solvents for the quality your product deserves.

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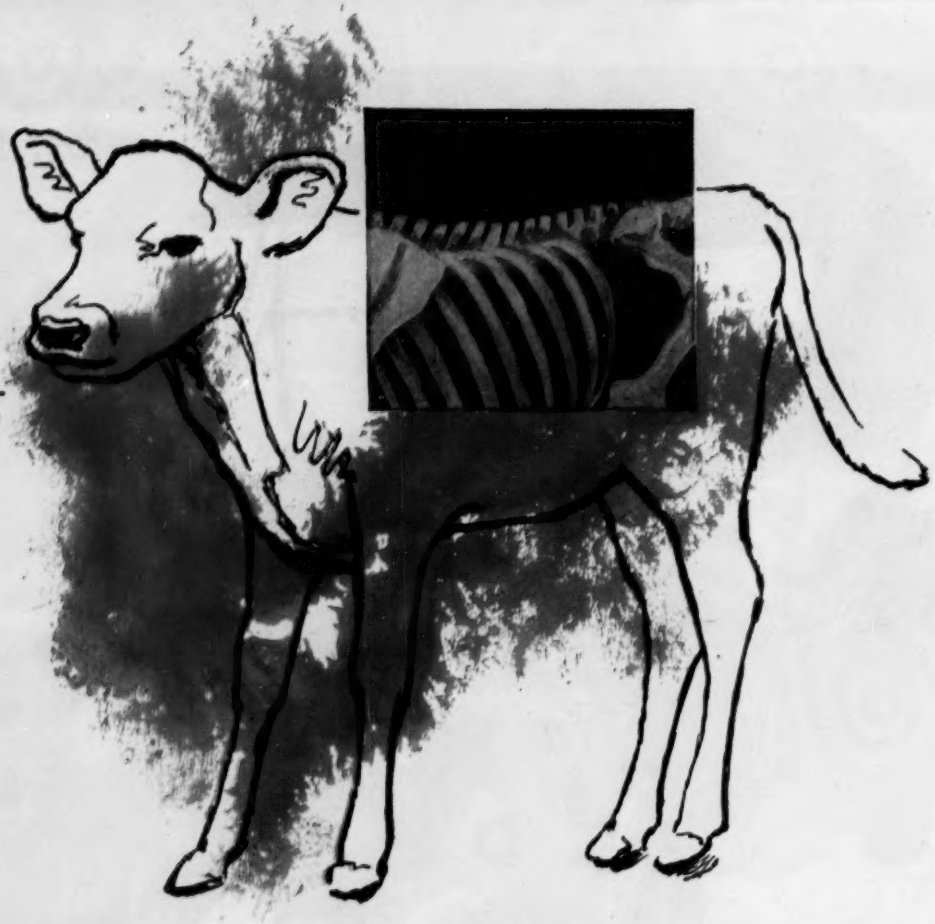

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Ammonium Fluoborate
Aluminum Fluoride
Magnesium Fluoride

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Bone Black Pigment (COSMIC® Blacks)
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Sulphuric Acid • Insecticides-Fungicides

Market Newsletter

CHEMICAL WEEK
OCT. 1, 1955

The end of this week will bring with it a significant pivot point in '55's chemical pricing pattern—one that will likely indicate a definite hop in year-long price indexes. For then (Oct. 1), a lengthy list of items is to be increased.

Most of the advances, though, will affect contract customers. Spot prices, more or less, have been moving up on an "immediate" basis over the past few weeks.

Among the heavy chemicals, caustic soda, soda ash, chlorine, some phosphates, carbonates, and acids—as reported here earlier—are all slated for higher price tags.

Of the acids, for example, phosphoric will be raised 25¢/cwt. on both 75% food-grade and 85% NF material to set new tank-car prices of $5.35/cwt. and $6.40/cwt. respectively. The 80% acid will cost 31¢ more after the first of the month, sell for $5.75/cwt.

Few expect any immediate changes in schedules now posted on nitric, hydrochloric, hydrofluoric, or sulfuric acids. Demand for hydrochloric, for instance, though holding up fairly well generally, is lagging behind supply in some areas of the country.

On the other hand, buying interest in sulfuric will be sustained through the balance of the year, despite the seasonal drop-off in fertilizer manufacture. Likely consumption props: paint pigments, rayon, steel.

Output of the latter is clipping along at better than 95% of capacity, and setting records. This August steel production totaled 9,583,000 tons—exceeding by more than 177,000 the previous high for that month, '53's 9,405,580 tons.

And beginning next week users of some chlorinated solvents will have to reconsider manufacturing costs in light of higher prices. Carbon tetrachloride and trichlorethylene both are scheduled to go up ½¢/lb. New technical-grade tank-car listing for the former will become 9½¢/lb.; for the trichloro, 10¾¢/lb.

There's little indication at the moment that these revisions will have any effect on perchlorethylene prices. When boosted last (*CW Market Letter, June 4*), not all marketers were convinced the move was propitious. Demand since then has shown some slight improvement, but, say marketers, "not enough."

The nation's selenium hopper will be a little fuller in the future if the world's first available deposit of commercial-grade selenium meets expectations.

"Excellent concentrations of selenium assaying as high as 0.68%" have been discovered in Wyoming by the Shawano Development Corp. (New York). The firm will develop a commercial process and set up a mill, after extent of the deposit has been determined.

But shortage-plagued consumers can sit back and relax a while longer; supplies probably will remain tight at least until 1958.

But something for copper producers to fret about will be Western Electric's intention of pushing quantity production of aluminum telephone cable to replace standard copper wire. Mounting concern over sharply rising prices and

repeated shortages of copper has given impetus to the program.

It's too early to tell how much copper will ultimately be released to consumers by this changeover, since developments will depend partly on the future pattern of copper prices and availability. But Western Electric now uses some 100,000 tons of copper annually, so the switch—when it comes—will not be penny-rate.

Copper chemical consumers continue to have their problems, too, as another round of price increases goes in effect. Behind the higher listings: heavily weighted demand, short stocks, higher metal costs. Affected thus far (and for some, the second time in a matter of weeks) are copper sulfate, carbonate, cyanide, hydrate, and oxychloride.

Both CP and crystals (99%) sulfate are up 40¢/cwt.; monohydrated, as well as tribasic sulfate, will cost $1/cwt. more. Advances on the others range from copper carbonate's 1½¢/lb. to copper hydrate's 9¼¢/lb.

Some pesticide prices are softening, but it's not unexpected. One BHC maker, for instance, has just reduced his low gamma material to 0.7¢/unit, (down 0.05¢/gamma unit) in carlots, 0.75¢ in smaller quantities.

Domestic consumption of insecticides will continue to slow down as the season tapers off. Here and there, though, late infestations (e.g., grasshoppers in Wisconsin and Nebraska, boll weevil in Oklahoma, Louisiana, other cotton states) are inducing sporadic spurts in sales.

There's further concern in the DDT market aside from that engendered by lessening farm use. Bids for export of the material are price-tagged considerably under domestic quotations. With brokers asking such low prices, some observers foresee a definitely unfavorable impact on the U. S. market—and soon.

Bulk buyers of hydrocortisone alcohol and acetate are in for a price break. New prices range from $4.75-$5/gram, are $1.25/gram less than previous schedules. This, incidentally, marks the first price cut in bulk hydrocortisone since it was made available last year.

Among the reasons advanced for the reductions: achievement of greater manufacturing economies. In the trade, however, many are inclined to regard the drops as being long overdue in light of the rugged competitive situation. Another reported lower-price prompter: inventories will probably move faster, make room for newer competitive products like prednisone and prednisalone.

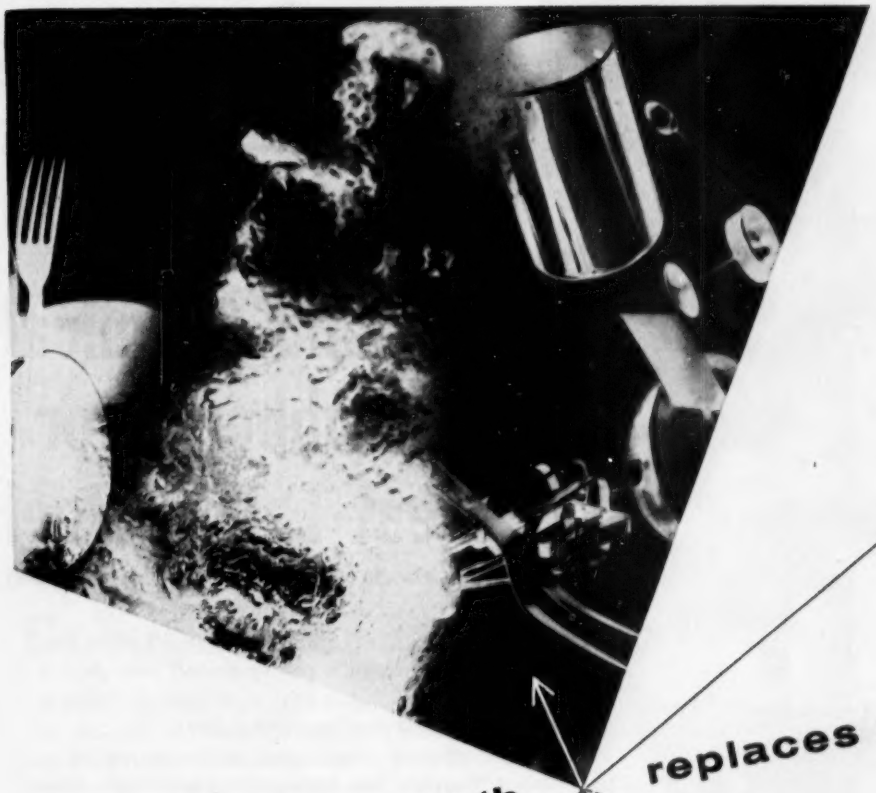
Followers of *CW*'s output and price charts will note that the graphs are now part of the new Charting Business feature on pp. 27-28.

SELECTED CHEMICAL MARKET PRICE CHANGES

Week Ending September 26, 1955

UP

	Change	New Price
Copper sulfate, CP, gran., bbls., wks. 100 lbs.	$0.40	$21.80
Copper crys., 99%, bgs., c.l., wks. 100 lbs.	0.40	14.90
Casein, Argentine, acid-precip., grd., bgs., c.l., duty pd.	0.01	0.245
Tallow, inedible, No. 1, tks., dlvd.	0.00125	0.0725
Tankage, Chicago, animal feeding, 9-11% ammonia, bulk, unit-ton	0.25	5.75



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How Victor Phosphoric Acid cuts cost for the metal finishing industry.

Labor for the mechanical buffing of metal parts is costly, slow, and the results lack uniformity. Victor phosphoric acid, in a special bath, does a *better* job with less labor, and in a fraction of the time. Flat sheets of metal or pieces of intricate design come out of the bath with a brilliantly bright finish. The process works on stainless steel, copper, brass and other metals. Bright dipping of aluminum is another short cut to better finishes. This process requires no electric current.

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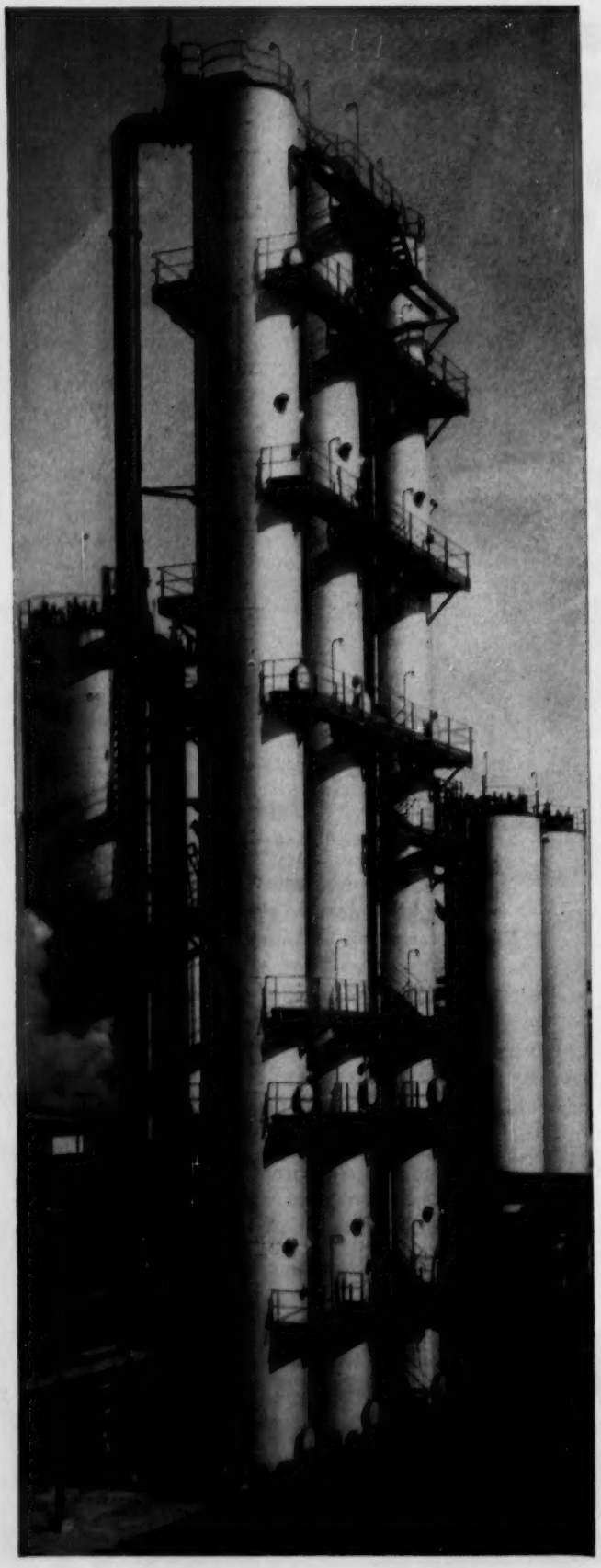

GRAVER

Gas and Chemical "scrubbers" for Great Lakes Steel

(DIVISION OF NATIONAL STEEL CORPORATION)

At Great Lakes Steel Corporation's Blast Furnace Division, a new by-product coke plant is equipped with a total of 25 large examples of Graver's craftsmanship in steel.

These structures, shop-fabricated at Graver's East Chicago plant and field-erected on the site by Graver crews, were built to the designs of Wilputte Coke Oven Division, Allied Chemical & Dye Corporation. These include bins, stacks, gas coolers, tanks for chemical feed, storage, and settling—and scrubbers such as the three 132′ towers shown at the left.

This variety of quality fabrication indicates Graver's versatile craftsmanship—demonstrates Graver's ability to shop-fabricate and field-erect structures for the steel, petroleum and chemical industries. For process and storage equipment in steels, alloys or clads, Graver's offices across the country are staffed with competent engineers ready to serve you.

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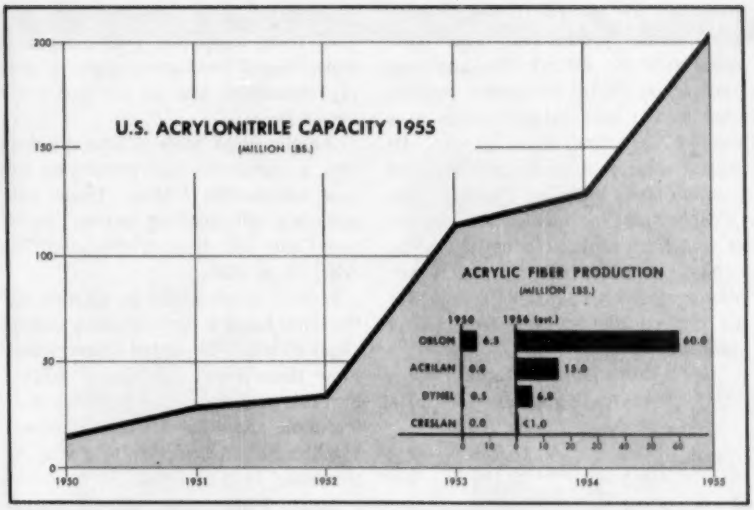

Enough—For How Long?

More acrylonitrile? The very thought—in view of acrylonitrile's lop-sided supply/demand condition—is enough to give current producers cause for concern. Right now total acrylo capacity in this country adds up to about 204 million lbs. An estimate—and it's an optimistic one—of 1955 consumption: something under 100 million lbs. (Note that consumption last year tallied about 64 million.)

A good slice of this year's increased capacity is accounted for by the recent onstreaming of pioneer American Cyanamid's delayed* Fortier, La., plant and newcomer B. F. Goodrich's acrylonitrile installation, part of the acetylene complex at Calvert City, Ky. The former is capable of turning out 50 million lbs./year of the acrylic raw material; the latter, approximately 24 million lbs./year.

These, in addition to Monsanto's 60-million-lb. acrylo plant at Texas City, Carbide's 35-million-lbs./year Institute, W. Va., unit, and American Cyanamid's original acrylonitrile plant (35 million lbs.) at Warners, N. J., make up the U.S.'s more-than-200-million-lbs./year potential.

Periodically, speculation arises that other companies are making ready to edge into the crowded acrylonitrile arena. Announcement last week of near-completion of ethylene glycol and ethylene oxide expansion at Dow's Freeport, Tex., works augured to some that the company may undertake acrylonitrile manufacture (ethylene oxide is a prime requisite for acrylo). And Dow's expanded units can turn out an additional 48-50 million lbs. of the glycol—or, more significantly, some 60 million lbs. of ethylene oxide.

Du Pont, the country's largest acrylonitrile consumer (for its Orlon operations), is also tabbed as a likely entrant. When queried about the probability, though, the Wilmington firm told *CW* that "Du Pont is contracted well ahead for its requirements, and has no plans at the moment for acrylonitrile manufacture."

Such speculation has been going on since the end of World War II; it obviously stems from the fact that Rohm & Haas, as well as Du Pont to a lesser extent, was formerly an acrylo producer. Their combined output, however, scarcely matched half of American Cyanamid's capacity at the time.

Too, several major oil companies—including Shell, Phillips and Sinclair—at one time or another have scouted the economic feasibility of making acrylonitrile.

But as of now, only those listed *(see box)* turn out the synthetic fiber material, and in ample quantities to cover present—and, some observers insist, just about all the foreseeable—requirements.

There may be a change in the line-up next year, though. American Cyanamid is reportedly contemplating cutting out production of acrylonitrile at its old Warners plant. But even this 35-million-lb. deduction will leave a more-than-69-million-lbs./year capacity in excess of the current consumption rate.

Commercial acrylonitrile usage has undergone a complete inversion of its two top outlets in the past few years. As recently as 1950, nitrile rubber (N-types of synthetic) was still dipping into as much as 70-75% of the available 15 million lbs. of annual production. Acrylic fibers had scarcely begun to make a percentagewise impression on the acrylo market. Relatively small amounts were filtering into plastics and other uses.

By the end of 1956, the synthetic fibers (chiefly Orlon, Chemstrand's Acrilan, Carbide's dynel and Cyanamid's now-pilot-planting Creslan) will likely be taking a near-65% of the acrylonitrile consumed in the U.S. *(see end-use pattern)*. By contrast, nitrile rubber products will tick off about 17%—or some 20 million lbs.—of the amount marketed. (A good deal, if not all, of Goodrich's new output will eventually go to acrylonitrile-rubber uses.)

Nitrile Spark: Wartime demand for nitrile rubber as a supplement and

U.S Acrylonitrile Capacity 1955
(million lbs.)

American Cyanamid	Warners, N.J.	35
" "	Fortier, La.	50
Monsanto	Texas City	60
Carbide and Carbon	Institute, W. Va.	35
B. F. Goodrich	Calvert City, Ky.	24
U.S. Total		204

* Originally expected to be in operation in early '54.

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substitute for natural rubber vitalized acrylonitrile production. The man-made rubber's special characteristics, particularly its oil resistance, contributed to the soar in production to a peak 17,000 long tons in '44. Its biggest uses: in self-sealing linings for gasoline tanks in military aircraft, and in rubber pipeline used in the transfer of fuel from tankers to naval vessels.

Not until 1952 did nitrile rubber output again exceed 16,000 tons. But it's clipped along since. The yearly rundown:

N-Type Rubber Output Including Latex

	long tons
1952	16,288
1953	20,198
1954	21,396
1955 (est.)	25,000

Bulk of today's nitrile consumption still hinges on the oil-resistance quality; most goes into mechanical rubber goods, such as gaskets, gasoline hose, molded products, etc. Predictions have been made, however, that blends, especially with vinyl chloride resins, may one day become a significant nitrile rubber outlet—and concomitantly a bigger acrylonitrile taker.

Fiber Domination: Prospective output volume of synthetic fibers will continue to overshadow all other acrylonitrile uses. But two short years ago, it was not difficult to find many who were certain that the "miracle" materials were a complete flop *(CW, Aug. 1, '53, p. 58; Aug. 8, '53, p. 67)*.

Overadvertising, overpromotion, and then some serious production problems (including brittleness and dyeing difficulties) combined to seriously darken acrylic synthetics' future.

By now, of course, the problems have been solved, and synthetic fibers and materials have become an integral part of the textile scene. Indeed, they have cut deeply into markets once held exclusively by wool and cotton.

Paradoxically, acrylonitrile use may soon dilate dramatically with the acceptance of a cotton-inspired process —cyanoethylation, the physical and chemical modification of cotton fibers with acrylonitrile *(CW, Aug. 21, '54, p. 97)*. (Cyanoethylated cotton is said to have increased dye receptiveness, permanent resistance to rot, mildew, bacteria, etc., higher abrasion- and stretch-resistance.) Cyanamid has been actively researching cyanoethylation for the past five or six years; Monsanto, more recently. Late last year both completed pilot-plant and experimental production units to supply evaluation lots of the processed cotton fibers.

Acrylic fibers have of late splashed into a glamorous and potentially big new outlet—fur fabrics. These new materials are sparking expansions in both Orlon and dynel production *(CW, Sept. 24, p. 108)*.

Use of acrylonitrile in plastics, on the other hand, is moving along slowly, albeit steadily. Estimated consumption some three years ago was 5 million lbs.; this year the rate is probably near 6 million, and during '56 an additional 1 million lbs. of acrylonitrile may be consumed in this outlet.

Much hope is pinned on future sales of acrylonitrile-styrene plastics (e.g., Carbide's Bakelite C-11, Dow's saran F-120, and others). Products like Naugatuck's Kralastic, too, are expected to continue as good-size acrylo users. And Cyanamid's report just last week—that it's now making pilot-plant quantities of a new plastic, polymethyl styrene—may augur swelling acrylo consumption. Methylstyrene, avers the company, may be combined with acrylonitrile to make other forms of plastics.

ACRYLONITRILE END-USE PATTERN 1956

(million lbs.)

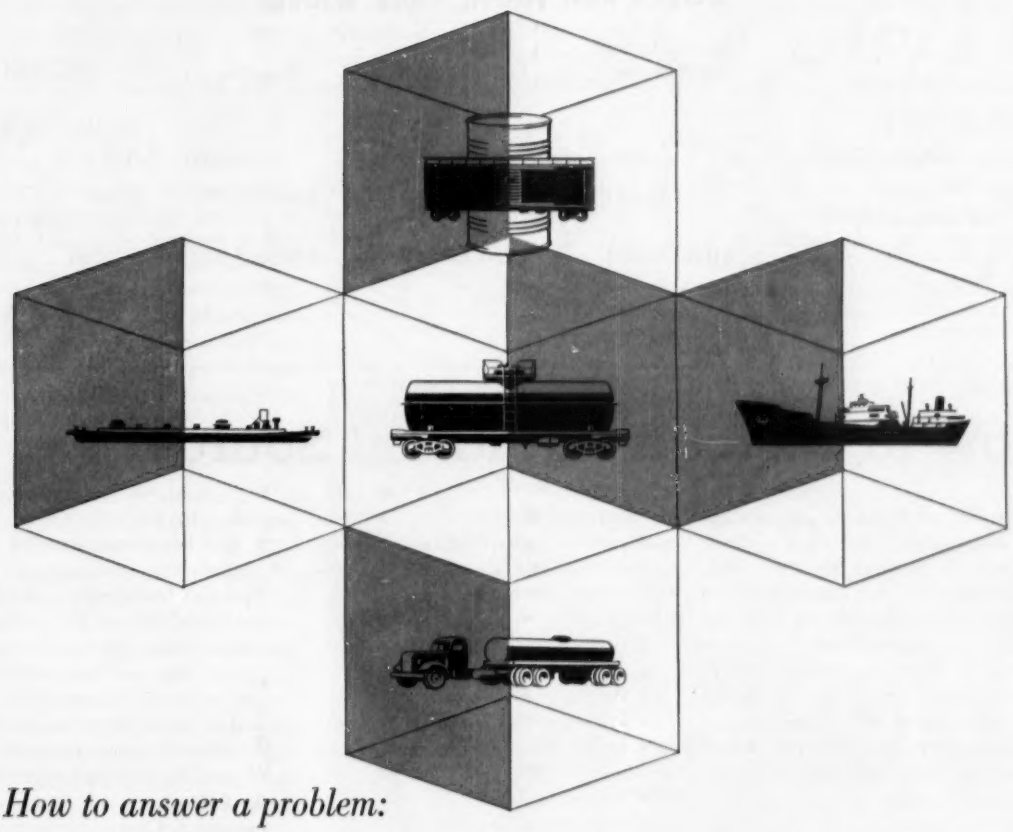
Acrylic fibers	76-80
Nitrile rubber	18-20
Plastics	6-7
Other	14-15

Price Pattern . . . Down: Today acrylonitrile customers can buy the material for 27¢/lb. Compare that with early '53's 43¢ price; it's evident that competition among marketers is, and has been, rib-bruising.

But the lower price may well ease the onus on acrylonitrile producers. Until now, market analysts have opined that the material's high price has been a definite growth-deterrent.

Over the long term, few will dispute the belief that U.S. acrylo capacity will be strained to satisfy growing demand. But now, this much is certain: the short-range acrylonitrile picture looks mighty overdeveloped.

DOW



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DOW

COSTS RUN HIGH, VARY WIDELY

	Van de Graaff Accelerator	Resonant Transformer	Reactor	Cobalt-60
Voltage (MEV)*	2	2	—	1.2 (gamma avg.)
Power Output (KW)**	0.50	5	50-100	.015
Cost of Source (no auxiliaries)	$56,200	$175,000	$100-300,000	$5,000 (per 1,000 curies)
Cost of Source (installed)	$100-130,000	$220-250,000	$200-600,000	$12,000

* Million electron volts.
** Kilowatts.

How to Select a Radiation Source

Shopping for a radiation source can be a puzzling experience for a chemical research director. But it's a chore that an increasing number of research management men are facing in setting up radiation research facilities in their companies. Radiation-emitters today are available in a wide and variegated array of reactors, accelerators, fission products, and miscellaneous machines.

Ranging widely in initial cost (*see box above*), radiation sources can pose equally varied demands on the budget for shielding, power, lab design, etc.

Choice of radiation source depends largely on the type of research it will be used for, e.g., inducing reactions and polymerizations, sterilizing pharmaceuticals, and miscellaneous applications of radiation to chemical processes.

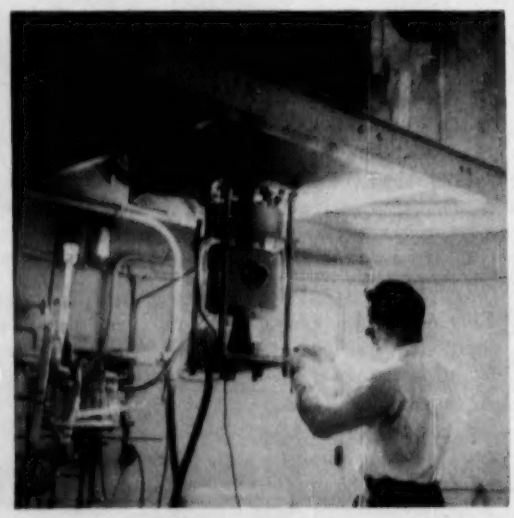
This in turn will determine:

- Type of radiation required.
- Penetration power needed.
- Uniformity of radiation field.
- Dependability against breakdowns.
- Safety.
- Budget available.

For many companies (e.g., Esso, Diamond Alkali, Goodrich, etc.), a cobalt pipe, made radioactive in an atomic pile, fills this bill of particulars. But lately, machines of various kinds have been gaining favor.

The new-found success of Upjohn and Atlantic Refining Co., in the use of particle accelerators can be a powerful argument for machines. Offering inherent safety advantages (they can be turned off by a flip of a switch) and high radiation intensities, these devices are a good bet to remain popular where high throughputs of thin materials are required. Case in point: polyethylene film irradiation.

Among the newest of such devices is the Capacitron. Under development



Two Case Histories:

1 Atlantic Refining Co. uses a $75,000 resonant transformer (*left*) in irradiation studies aimed at upgrading gasoline (*CW, Aug. 20, p. 62*). First installation of its kind in the East, the 1-million-electron-volt accelerator jams electrons up to speeds of 600 million* miles/hour, emits them as a tightly focused beam.

Atlantic's choice of a radiation source is grounded in theory. Effective molecule-splitters, electrons aren't likely to induce radioactivity in irradiated materials.

Resonant transformers are flexible (output is varied by a tuning dial), feature low penetration, easy shielding, control and maintenance—all of which the firm feels are desirable in a research machine.

For production purposes, the output of Atlantic's accelerator can reportedly be raised to 10 million electron

by Electronized Chemicals Corp. (New York), this machine produces electron bursts of high intensity and short duration (microseconds).

The company has not yet put a price tag on its product, says only that it may ultimately supply radiation at $1/kwh. or less (including amortization, operation, and maintenance). Electronized Chemicals is thinking in terms of renting the machine to potential users. But that's some way off.

Meanwhile, there's no serious threat to the present workhorses among particle accelerators—Van de Graaff accelerators (made by High Voltage Engineering Corp.) and General Electric's resonant transformers.

Picked by Upjohn for drug-sterilization work *(CW, Aug. 6, p. 68)*, the Van de Graaff accelerator is also being investigated for food processing duties.

GE's resonant transformer, used in research by Atlantic Refining and a number of chemical firms, has no moving high-voltage parts, is less costly to construct and maintain than the Van de Graaff. GE will rent a 1 MEV machine for $22,000/year, sell it for about $75,000.

Such machines, however, aren't the entire answer. Brookhaven National Laboratory's (Atomic Energy Commission) Bernard Manowitz* points out that nuclear reactors offer certain inherent advantages: high capacity, high penetration power, ease of operation. But the high cost of constructing a reactor is a severe deterent to its greater popularity in research. One answer to this problem is the cooperative arrangement recently entered into by eight firms (*CW, Aug. 27, p. 44*).

* Engineer in charge of Brookhaven's Fission Products Utilization Project, Manowitz is also an associate of consulting firm Radiations Applications Inc., (New York).

* Manufactured or bid upon by such firms as Westinghouse Electric Corp., Vitro Corp., American Machine and Foundry Co., Babcock & Wilcox Co., Foster Wheeler Corp., General Electric Co, Kidde Nuclear Laboratories, North American Aviation, Inc., and Nuclear Development Associates, Inc

Around 25 small research reactors* (1-1,000 watts) have, to date, been built or are under construction. Operational note: even a small reactor costs from $30-50,000/yr. to maintain.

Fortunately, research management doesn't lack for help in finding the right radiation source. Reactor and accelerator builders, the Atomic Energy Commission, and a growing list of consulting services are all willing and, in most cases, eager to lend a hand in the search.

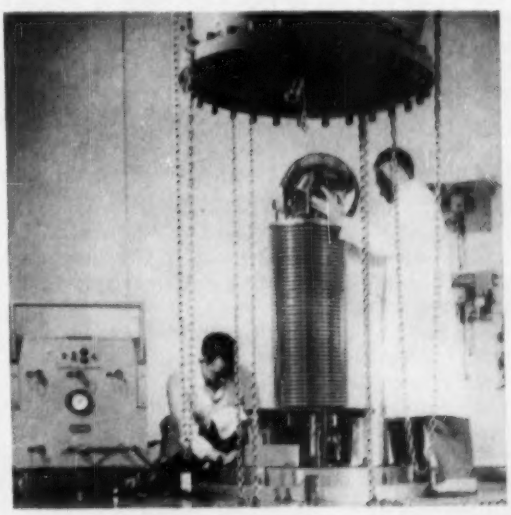
BROOKHAVEN'S MANOWITZ: In nuclear reactors, more room to work.

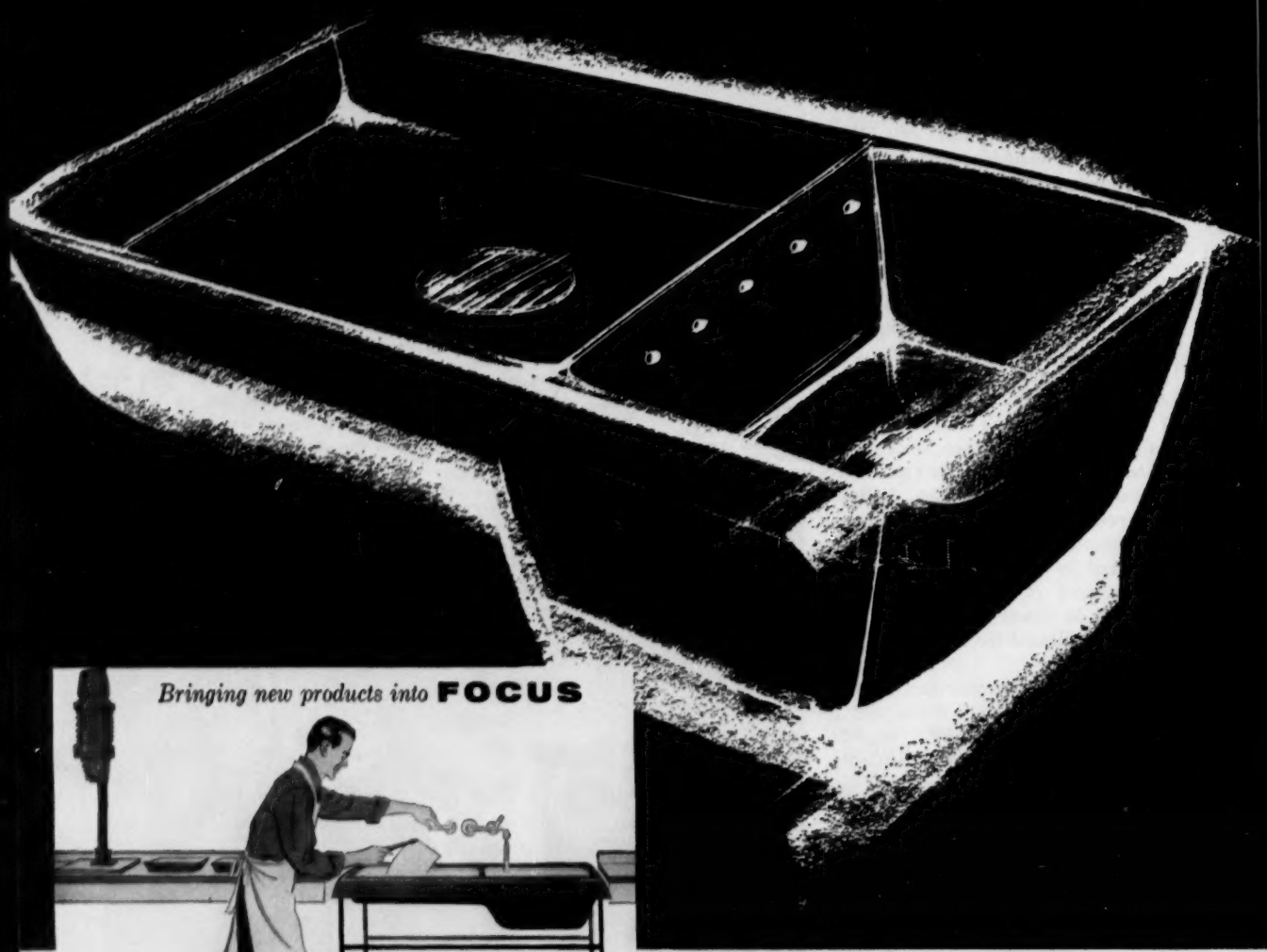
Behind Their Selections

2 Upjohn Co. (Kalamazoo) originally bought a Van de Graaff generator for research, now uses it for production drug sterilization. An electron accelerator, it scans a pencil-size beam over traveling trays of packaged drugs.

The firm was looking for a research machine that would give information useful in production. Requiring only limited penetrating power for its studies, Upjohn based its decision on safety of operation (the Van de Graaff can be quickly turned off), precise controllability, and high dose rate. Cost of the 2-million-electron-volt machine five years ago was $80,000. But the price has since dropped appreciably.

Because of inherent advantages, the Van de Graff is a good bet for drug sterilization even if cheaper radiation (e.g., fission waste) comes along.





Could millions of photography fans make a market for a portable dark room sink?

LOW-COST PRODUCTION OF SUCH AN ITEM IS PRACTICAL WITH REINFORCED PLASTICS!

The need for a dark room sink is keenly felt by millions of men and women whose hobby is photography. They now lack proper facilities for doing their own printing and developing.

Their problem could be solved by a portable unit which sets up quickly in basement, kitchen or bathroom—and stores out of sight in a closet.

The ideal material for such a sink is at hand. By using fibrous glass, bonded with polyester resins, the sink could be molded in one piece. Its weight would be negligible. Its strength would be great. And its cost could be low.

Rounded corners would assure easy, thorough cleaning. There would be no worries about corrosive chemicals damaging the sink—no rust to contaminate prints.

The use of reinforced plastic materials grows every year. They are already widely applied to sports car bodies, boats, corrugated building panels, modern furniture.

Monsanto supplies the basic ingredients for polyester resins. These include Monsanto *styrene monomer* and *phthalic* and *maleic anhydrides*.

If you would like a glimpse of other possible new uses for reinforced plastics, you are invited to request "A Sketchbook of Profitable Products." Write on your letterhead to Monsanto Chemical Company, Plastics Division, Dept. CW-10, Springfield 2, Mass.

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Technology

Newsletter

CHEMICAL WEEK
OCT. 1, 1955

Atomic heat for chemical processes moved out of the "just talking" stage this week with tentative agreement by Atomic Energy Commission and Bureau of Mines to initiate development of a suitable reactor for synthesis gas production. Such an atomic furnace would operate at 2000-3000 F.

Dictated by the kinetics of synthesis gas production—which gives poor yields below 1800 F—these useful temperatures provide a golden economic opportunity for atomic energy to prove its mettle in the chemical industry: it's estimated that reactor heat could slice as much as 9¢/1,000 cu. ft. from the cost (15-20¢/1,000 cu. ft.) of making synthesis gas by burning coal with tonnage oxygen.

Bureau of Mines' interest in the project stems from its quest for new and less costly methods of producing synthesis gas (coal would be used in the atomic process); AEC is eager to open a new world for atomic energy to conquer; while industry is understandably intrigued with the possibility of less-costly production of the entire spectrum of chemicals based on synthesis gas.

Some chemical firms that are reported to be talking with AEC are American Cyanamid (on hydrogen cyanide), Spencer Chemical (ammonia) and Union Carbide. Food Machinery & Chemical, which has tried its hand at direct thermal fixation of nitrogen, also has more than academic interest. Spencer, already actively engaged in a feasibility study of the new field, is keeping in close touch with both AEC and Bureau of Mines on the development of conceptual designs and materials of construction.

Enough companies have expressed interest to convince both government agencies that the time is ripe for a public meeting on the subject. Such a get-together, in which all interested companies could participate, probably will take place sometime next month.

Even though you've been hearing a lot of news about polyethylene, take a hard look at what's going on now:

Most of the recent interest has centered on the linear polyethylenes as produced by either the Phillips or the Ziegler process. But now there's a third; Italy's Montecatini has been quietly moving along a low-pressure process of its own.

In this country, half a dozen firms have obtained licenses to the Ziegler process; at least four (Carbide, Koppers, Du Pont and Monsanto) are actively doing process development. In Germany, Hoechst is turning out Ziegler polyethylene in pilot-plant quantities. And Kohle-Oel-Chemie—an offspring of Hoechst, Mannesmann A. G. and Deutsche Erdol—decided to build a 50-million-lb/year Ziegler plant. Ruhrchemie and Hibernia have also obtained licenses to the process, as has England's Petrochemicals Ltd., recently taken over by Shell.

Although the number of licensees to the Phillips process is smaller, the process is actually closer to commercialization. Phillips is building its own commercial plant (probably at least 100 million lbs./year) and Grace has obtained a license, is going to pump $18 million into a polyethylene project. This will not only put Grace into the polyethylene field in a big way, but also it might well put its affiliate, Davison, in an enviable position. For it's no secret that Phillip's interest is in the resin, not the catalyst. Conceivably, Davison will make the catalyst (probably a chrome oxide, *CW, May 14*) for Phillips as well as for Grace and any other future licensee.

The big question right now: Where will Grace build? Possibly, the firm has not yet decided. But one thing is certain: the East Coast is being given serious consideration. This makes a lot of sense too: the largest concentration of polyethylene resin users is in the Baltimore-New York-Boston area. Yet the

closest polyethylene plant is Carbide's at Charleston, W. Va. But that's just one of the reasons why . . .

The East Coast is going to get a big, new ethylene refinery.

There's nothing official on it as yet, but Standard Oil (New Jersey) is an odds-on bet to build an ethylene unit at its mammoth Bayway, N. J., refinery. Contemplated production scale is anybody's guess, but it figures to be considerable.

The move is a natural, of course, for Jersey Standard, which has refinery off-gas available. More surprising is the fact that Standard (Calif.), which has no refinery facilities in the East, is a likely candidate to build an ethylene plant at Perth Amboy, N. J.—in the same general area. So surprising is the move, in fact, that many in the industry don't credit its credibility, but the truth of the matter is that the project is still very much alive.

The plan under consideration calls for California Standard to tie up a gas supply, then crack it to ethylene via the Wulff process—essentially a thermal cracking in a regenerative furnace. The process has been highly touted for several years, but most frequently it's mentioned as a method of getting acetylene from natural gas. And it has never been commercialized. California Research, the researching member of the California Standard family, has probed and polished the Wulff process.

In any case, ethylene production at one of the Eastern refinery centers is inevitable. Tide Water, to name another, has been studying the ethylene market, would be prepared to make it at its new Delaware refinery. There's hardly a refiner in the East, in fact, who hasn't considered such a venture at one time or another, for the economics of such a move are attractive indeed.

Just look at the freight savings by making ethylene chemicals close to their market. Even a large shipment of polyethylene from Houston to New York City costs approximately 1-1½¢/lb. (In the case of other ethylene-derived chemicals, you're paying even more freight on the ethylene content because you're adding heavier atoms to the molecule.)

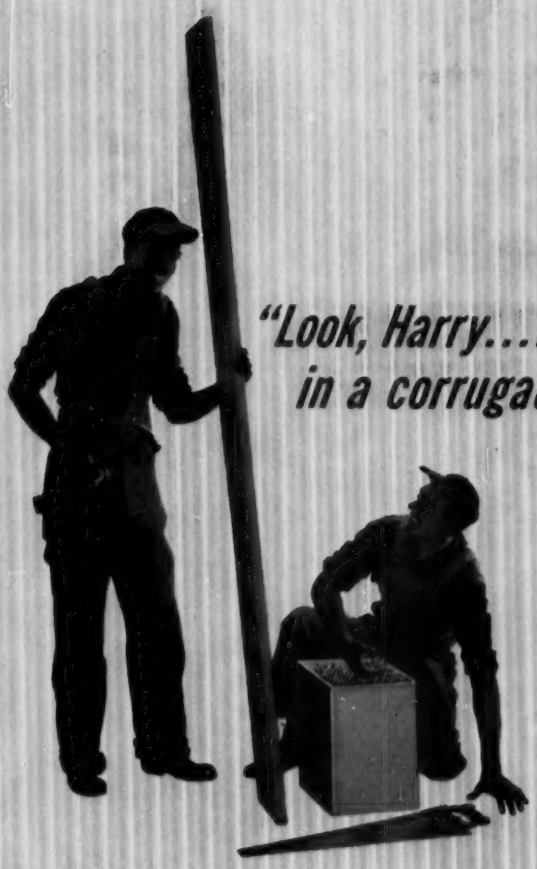
What it means is that the ethylene producer on the East Coast has a margin of 1½-2¢/lb. to work on. That is, an East Coast producer could sell it for 6-6½¢/lb. and compete with 4½¢/lb. ethylene on the Gulf Coast.

Such favorable costs are largely academic without cash customers who'd be willing to make the ethylene-derived chemicals. And that's what has prevented ethylene production from being a reality much sooner. At the same time, there's no lack of potential customers.

Take, for example, Hercules and General Aniline and Film:

• Hercules is presently a big user of ethylene—although indirectly—for its cellulose acetate operations. There it buys ethanol (from ethylene) for acetaldehyde for acetic anhydride. It also uses lesser amounts of ethylene chemicals for its rosin amine production. Although the supply-demand situation in ethanol is favorable for the buyer right now, Hercules is believed by the trade to be a licensee of Ziegler's polyethylene process, and also to have given serious thought to integrating backwards in ethanol. The two factors might well be enough to make a firm contractor of ethylene.

• GAF's need for ethylene stems from its ethylene oxide-based detergents. GAF's plant at Grasselli, incidentally, is just a short pipeline from either Jersey Standard's Bayway refinery or Cal Standard's proposed Perth Amboy site.



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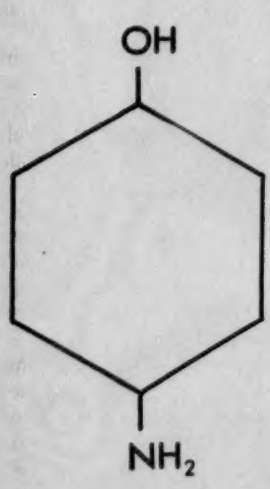

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Feature Attractions

Held on the scenic, sprawling University of Minnesota (Minneapolis) campus, last fortnight's 128th National American Chemical Society meeting (attended by more than 6,000) featured these industrially significant developments:

• Oren Williams and Jack Graham of Food Machinery & Chemical Corp.'s (Middleport, N. Y.) Niagara Chemical Division unveiled a series of carboalkoxy and carbophenoxy alkylenebisdithiocarbamates said to be highly active as foliage fungicides. Most active of the carboalkoxy derivatives: S,S'-bis-(carbo-2-bromoethoxy) ethylenebis (dithiocarbamate), which reportedly can be prepared in high yields by interaction of 2-bromoethyl chloroformate and disodium ethylenebis(dithiocarbamate) in aqueous solution.

Highest fungitoxicity, however, is observed with isomeric carbonitrophenoxyethylenebis (dithiocarbamate) derivates. The latters' effectiveness is believed to hinge on decomposition *in situ* to ethylene diisothiocyanate and a nitrophenol.

Encouraging greenhouse results thus far haven't been matched by field performance. Cause: poor stability of the test chemicals in common clay diluents. But further formulation studies are under way.

• Another plant-fungicide newcomer, copper dihydrazinium sulfate (newly registered as Omazene), stacks up as an improvement on the familiar Bordeaux mixture. Olin Mathieson's Joseph Campbell cited the compound's effectiveness (against powdery mildew in roses) and lack of phytotoxicity at required spray concentrations (0.5 to 0.75 lb. of a 50% wettable powder in 100 gal. of water). Still to be determined: toxicity to humans after application to edible crops.

• Small-scale (10-gal.) stainless steel research fermentors described by W. E. Brown of Squibb Institute for Medical Research (New Brunswick, N.J.) are said to offer potential savings in labor, equipment, and raw materials in continuous fermentations. Fellow Squibb staffers C. L. Kroll and S. Formanek, along with American Cyanamid's A. S. Covert, aided in the studies.

• According to J. W. Sloan, C. L. Mehltretter, and I. A. Wolff of the U.S. Dept. of Agriculture's Northern

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RESEARCH . . . . . .

Utilization Research Branch (Peoria, Ill.), high yields of erythritol (60% of theory) and ethylene glycol are obtainable from periodate oxystarch via combined hydrogenation and hydrolysis. Hydrogenation is carried out over a Raney nickel catalyst at 1,600-2,000 psi. and 180-200 C, for 2 to 4 hours.

• Cyclodienyl sodium compounds, prepared from cyclodiene monomers and finely dispersed sodium, are highly reactive intermediates for a spate of potentially valuable products, according to Esso Research and Engineering Co.'s (Linden, N.J.) H. K. Wiese and C. A. Cohen. Tonnage availability of low-cost cyclopentadiene, methylcyclopentadiene and metallic sodium prompted their studies.

• Potable water and concentrated brine are products of a countercurrent, stagewise salt-water purification process reported by Arthur Rose and Thomas Hoover of Applied Science Laboratories (State College, Pa.). Using an original charge of 3.5% (by weight) sodium chloride solution, they obtained effluent containing 16 ppm. salt at one end stage, 19% sodium chloride brine at the other .

• Armour Research Foundation's (Chicago) G. M. Platz and C. K. Hersh have cast new light on ARF's technique of producing gaseous or liquid ozone almost entirely free of sensitizing (to explosion) substances. Citing patent negotiations as cause of the three-year delay in making the process public (nonsensitized ozone is described in U.S. Pat. 2,700,648), Platz and Hersh describe the method as purification of the process oxygen by high-temperature catalytic decomposition of sensitizing hydrocarbons.

Contaminants are chiefly organic, must be maintained below a concentration of 20 ppm. (expressed as carbon dioxide) to insure stability and safety of bulk liquid ozone and ozone-oxygen mixtures (e.g., for rocket fuels).

• Reporting on sugar research projects under way at Herstein Laboratories (New York), President Karl Herstein added synthetic plastics and fibers to the growing list of potentially remunerative sugar-based chemicals *(CW, March 26, p. 55)*. According to Herstein, whose laboratory has handled 22 sugar projects (sponsored largely by Sugar Research Foundation, the reaction product of sucrose,

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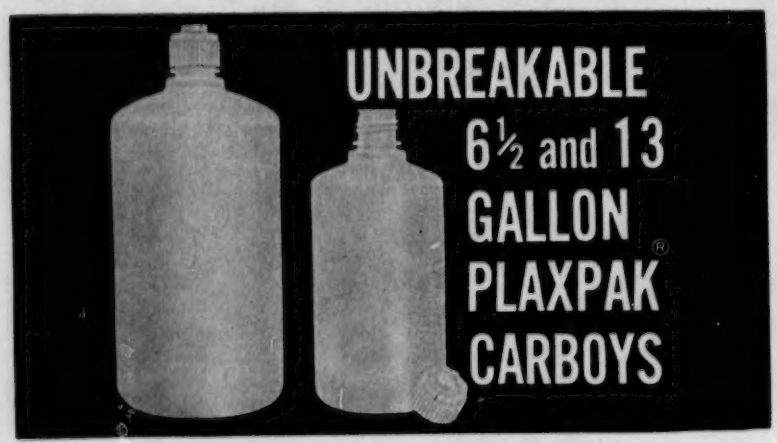

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urea and formaldehyde forms a hard, clear, colorless resin having a number of possible uses. Plastics from sucrose are now under investigation at the Bjorksten Research Laboratories (Madison, Wis.).

Reductive aminolysis of sucrose also looks commercially promising, avers Herstein. Preliminary work on the ammoniation of bagasse, he reports, indicates that a protein equivalent of well over 20% can be produced simply. This in turn could foster the utilization of bagasse for cattle feed.

Resin Grippers

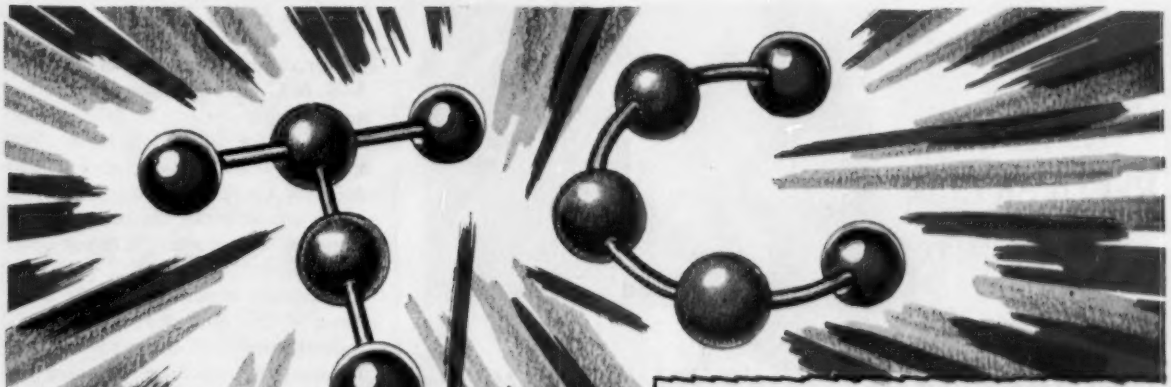
Three new chelating resins, synthesized by chemists of Rhodes University (Grahamstown, South Africa), might prove commercially useful for rapid inorganic separations:

- A condensation product of formaldehyde, resorcinol and pyrogallolcarboxylic acid forms a colored complex with barium, calcium and strontium ions. Promising use: quantitative removal of calcium from colored solutions (e.g., molasses).
- Diazotizing and coupling a resin of the o-aminophenol type with 2-naphthol yields a product that chelates copper at low pH. A column of the resin is said to be able to separate copper from magnesium ions in solutions buffered to pH 3.
- Chelating properties comparable to oxine's (8-hydroxyquinoline) belong to a resin made from oxine, resorcinol, formaldehyde. Capacity of the derivative, however, is reportedly low.

•

Growth Data: Expansion is making news this week at several organizations:

- General Mills revealed plans for moving its urban Minneapolis research facilities to a 104-acre site on the outskirts of the city. To be constructed along campuslike lines, the proposed research center (comprising several buildings) will be constructed over a three- to five-year period.
- Borg-Warner has started building the first unit of its new research center on a 36½-acre site in Des Plaines, Ill. When completed the multiunit installation will include facilities for chemical, physical, electronic, electrical, metallurgical and nuclear studies.
- Colgate-Palmolive has taken an



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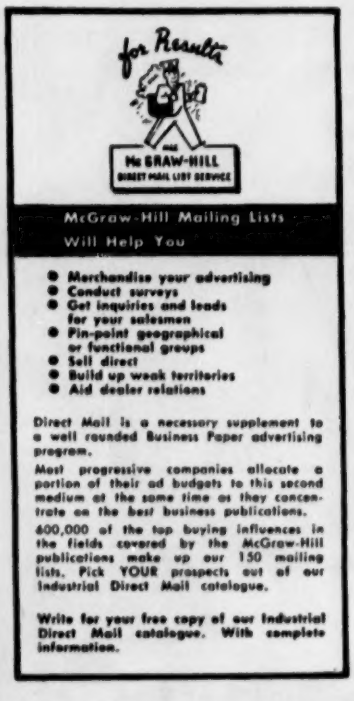
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RESEARCH . . . . . .

option to purchase a 35-acre Bloomfield, N.J., tract as a possible site for new central research laboratories. Plans are for 200,000 sq.ft. of floor space to accommodate between 350 and 400 staffers. Development and pilot-plant activities are scheduled to remain at the company's Jersey City, N.J., plant.

• Battelle Memorial Institute completed a new four-story $1.4-million chemistry building, thereby increasing its laboratory space for chemical research by 50%. The institute's chemical research activities employ 240 people, account for a volume of business put at $2.4 million for the current year.

•

Plans: If all goes as planned, the University of Southern California will soon have a $1-million industrial research center on its Los Angeles campus. Ground is slated to be broken this fall for the first of four building units to house facilities for chemical and petroleum engineering, electronics and electrical engineering, and mechanical and aeronautical engineering. The fourth unit will serve as headquarters for the entire operation. USC today handles 311 research programs (worth over $2.5 million) sponsored by industry and government.

•

Adhesive Aid: An ultrasonic technique of nondestructive testing of adhesive bonds is a new Stanford Research Institute-developed tool for adhesives research. According to the Air Force, which sponsored the SRI study, the ultrasonic method is superior (in terms of usefulness and correlation of results with those of destructive tests) to vacuum cup-capacitance and vacuum cup-mechanical interference techniques.

The SRI procedure was developed by subjecting various wood and metal laminates to ultrasonic vibrations, recording voltage frequency curves for satisfactory and defective laminate specimens. These curves were then correlated with bond strengths determined by destructive testing of the same samples. It's all in report PB 111678, "Development of Non-Destructive Tests for Structural Adhesive Bonds, Part 3, Mechanical Impedance Technique, April 1955" (39 pages), available from Office of Technical Services of U.S. Dept. of Commerce. Price: $1.

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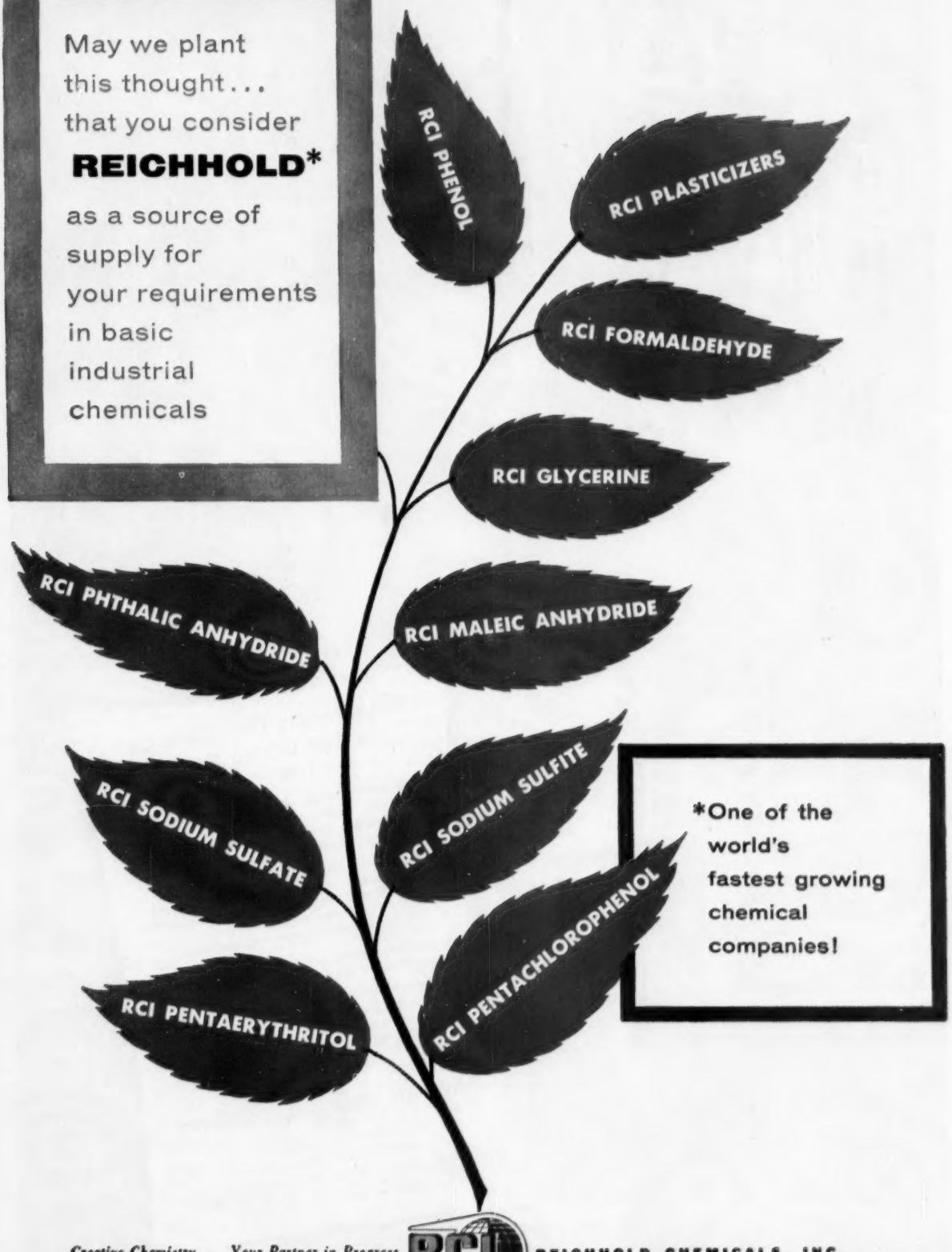

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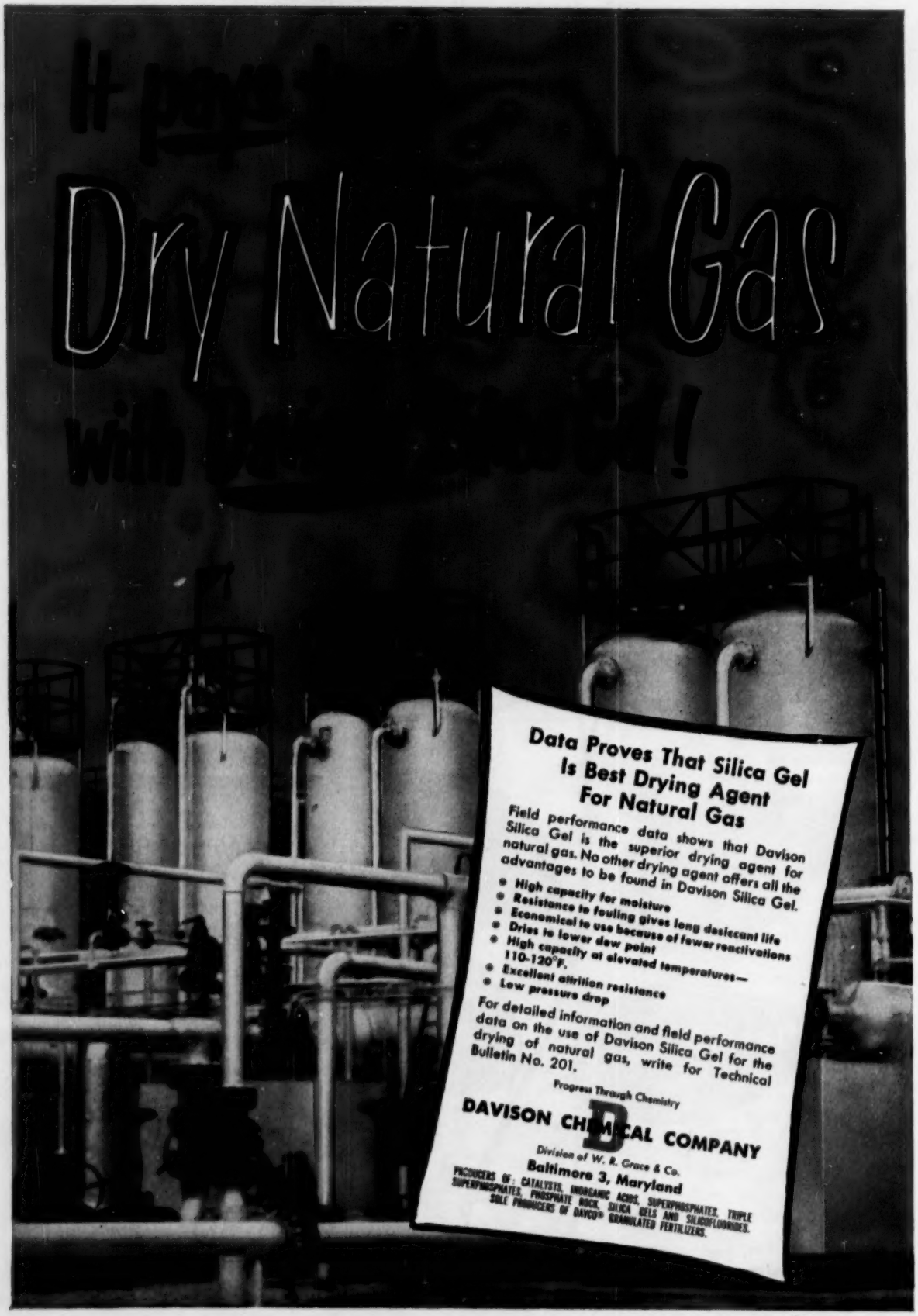
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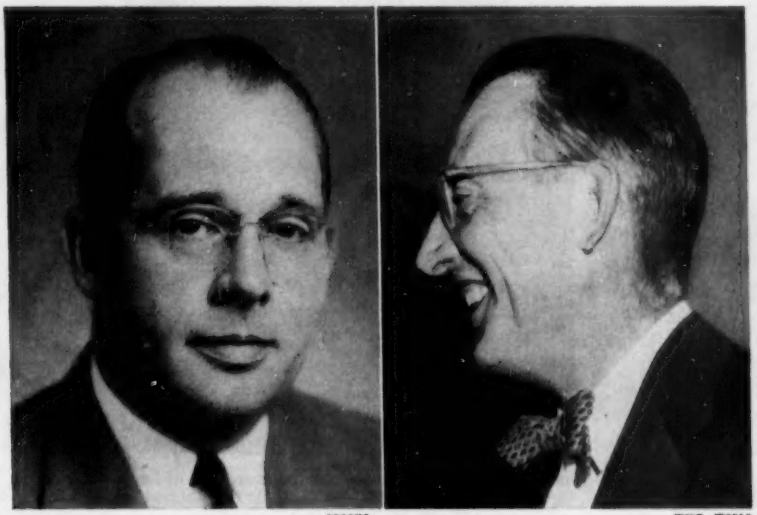


BROOKS WIDE WORLD

BAMBACH AND LARRICK: The ruled confronts the ruler.

Rules Can Be Rough

Chemical manufacturers' tribulations in marketing new products are nowhere more evident than in the current winnowing of rule change proposals submitted by Food & Drug Administration's George Larrick. The complex job of keeping up with legal requirements, for example, has become inherent in the commercial development of drugs.

Pharmaceutical men are not altogether happy with the proposed changes, will make known their views to FDA through concerted action by the American Drug Manufacturers' Assn. Meetings held this week covered step-by-step analysis of each rewording and addition to examine its effect on the industry. Comments: some changes are of benefit, will ease administrative procedures in submitting new drug applications, while others would cause serious delays and add to the burdens of manufacturers.

Specific among the latter are proposed new rules calling for the submission of complete case histories of patients participating in the clinical testing of new drugs, and rules calling for detailed descriptions of manufacturing processes. ADMA's Executive Vice-President Karl Bambach points out that clinical case histories are usually submitted on only a representative number of patients, that details of processing methods are among the zealously guarded secrets of the industry.

In both matters, collection and write-up of such information would be time-consuming for the manufacturer, would require far more searching analysis by the already understaffed FDA. Followed to the letter, the requirements would complicate and delay handling of new drug applications, would hike the cost of commercial development.

Hope of the manufacturers is for a rewriting of the rules, permitting more liberal interpretation. Industry comments:

- Proposed changes are legalistic, without regard to medical realities in collection of clinical data.
- Industry will be saddled with extra, unnecessary work.
- Supplemental applications will be repetitious of originals.
- Time lags could make applications obsolete.

On the other hand, say industry spokesmen, some of the rule changes are of benefit. In many instances the new rules merely formalize existing methods used by FDA and the industry in making application to manufacture new drugs. Foremost among these is a provision setting forth the right of applicants to have an "incomplete" application filed over the protest of the New Drug Branch. This implies the opening of a line of administrative and judicial appeal against arbitrary refusal to file an application.

A second beneficial provision would theoretically speed filing of the application by imposing a 60-day limit on the New Drug Branch for notifying the manufacturer that his application is incomplete or needs further study.

A further change eliminates the requirement that finished samples of brochures and labels be submitted. Instead it would require only a typewritten draft of the materials, obviating the necessity of having art and printing jobs done in advance of application filing.

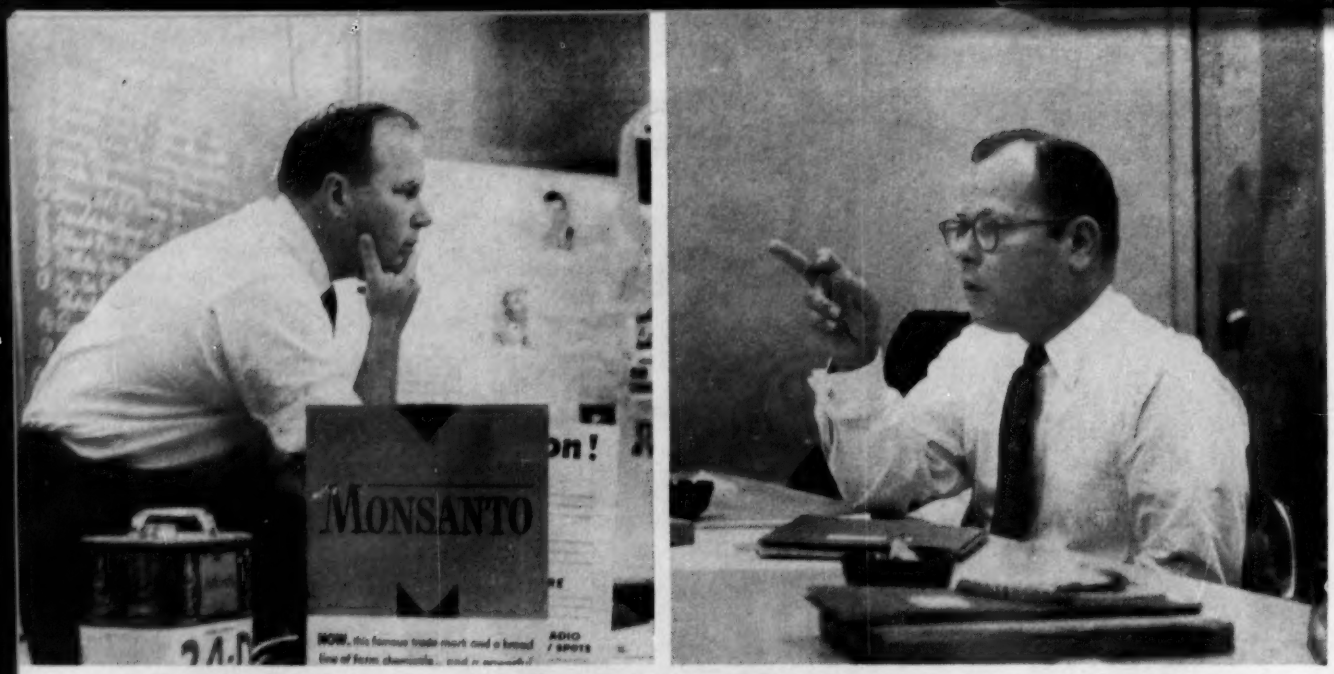
Those having an interest in the proposed changes have until Oct. 7 to submit their views in writing to the Dept. of Health, Education and Welfare. Results of this week's meetings of the legislative section of ADMA will be submitted to FDA at that time.

What will come of the regulations is yet to be determined, but most manufacturers feel that solutions can be worked out. Whatever the outcome, sales managers and marketing people have a stake in it.

•

Expanding Sales Coverage: The fast-sprouting farm chemical field has claimed yet another expansion. Dow Chemical is beefing up its marketing with three new special sales groups. One will mesh activities of product managers marketing specialties to the farm. A second will do the same on sales to railroads, highways, utilities, and other industry users. Long-term sales planning—new product, new use development; sales education; contact with farm purchasing influences—is the target of the third unit.

- Midwest-Overseas Trading Co. has been designated sales representative for the Midwest by the Westbrook Lanolin Co. (Bradford, England) for its line of lanolins, wool-alcohol, oils, greases, and rust preventives.
- Premium Chemicals, Inc. (Farmingdale and New York, N.Y.) has been selected exclusive Long Island, distributor for Merck & Co. (Rahway, N.J.) chemicals.



WILL IT WORK? Organic Division Ad Manager Greene ponders suggestion of salesman Leonard to aid Monsanto in . . .

Shaping a Farm Chemical Sales Program

Into the well-scrubbed cities and towns sprinkled across America's rich grain lands, five chemical salesmen will go this week. Few have had a greater task; few have been charged with more responsibility. For they are the men spearheading Monsanto's initial assault on the farm chemical market with Monsanto-labeled materials.

To these five belongs the mission of finding distributors, convincing them to actively push the company line. They are the men who must make friends with the county agent, vocational agriculture teacher and state experimental station man, line up influential people to make tests, and generally carry out Monsanto's basic merchandising program.

This program will introduce a line of insecticides, herbicides, and other farm chemicals (now at 18) to an initial area of 15 farm-belt states. Blueprints call for distribution from five regional warehouses to as large a chain of distributors and dealers as Monsanto can build. First-year target: 100 distributors; 2,000-3,000 dealers.

Monsanto's line will lean to patented, trademarked products, be backed with a hefty six-figure promotional program. Formulator sales will be pushed, too, but by a different sales group. It's possible that some canning and mixing will be contracted out.

Undoubtedly, this drive will prompt many a distributor query, but the salesman will have almost as many answers. Some:

• Market development. Pesticides and weed killers have a profitable future. Monsanto estimates the Midwest annually loses $630 million to weeds, $167 million to insects, and

TIGHT TIMETABLE: Salesmen (left), marketing executives Zorsch and Hammer set schedule: fall, seek distributors; December,

$965 million to plant diseases. But this market requires costly promotion and education—far beyond the resources of the formulator and distributor straddled with price-war-spawned thin margins. (Development cost of one new synthetic herbicide alone: $1 million.)

• Pricing. Cut-throat pricing now runs rampant. With a "name" brand moving at suggested prices, its price will be more resistant to the effect of price wars. (Name-brand prestige will cast doubt on a much cheaper product.)

• Natural advantages. A major producer of farm chemicals, the company has shortage-preventing access to raw materials (even more so with the imminent Lion Oil merger), an experienced research staff, ready cash, and plants convenient to the farm belt.

• Communications. Selling company-branded products will bring development men into close contact with the field (example: lab men will become more price conscious, more able to pinpoint research targets).

Much planning backs the salesmen's efforts. Market research proved a big potential market. A field survey now under way will determine who uses chemicals, who doesn't and why, how helpful the dealer is, how effective treatment is, what determines its need, where information comes from.

Another poll probed what dealers and distributors like about a manufacturer, what field business practices are. A third survey established how well known the Monsanto name is. And a collating project on existent data uncovered the relative rank of farm buying influences. Results helped establish the specifics of the company's three-pronged merchandising drive.

first shipments; early '56, promotion start-up.

Distributor program: Flexibility is the key word here. To entice distributors, the firm will offer:

• Incentives—free trips and prizes, probably, rather than discounts, free product stock.

• Sales tools—including a kit with a special catalog explaining promotion, copious quantities of direct-mail literature for dealer use, and probably an incentive to distributor salesmen to see that dealers use displays (a big problem).

• Competitive pricing—guarantee that prices will always be competitive.

• Dealer education — Monsanto salesmen will appear at dealer sales meetings sponsored by distributors. There'll be a series of brochures on effective sales techniques. And plenty of written information (with an eye on Miller bill liabilities, however) for dealers on how materials should be used.

• Service—special efforts made to design order procedures (easy-to-use catalog), shipments, terms, and contracts to resaler's needs. Distributor-company conferences on sales problems may be one feature.

Dealer program: Heart of this is a big display package. There'll be outdoor metal signs and an inside unit featuring a stop-sign emblem. A big wall chart will list crops, problems, treatments, and how-to-use data on materials. Literature and direct mail, newspaper mats, and radio and TV scripts round out the program.

Farmer program: Naturally, Monsanto has to build a name and do it fast. The way: advertising and publicity. Ads will favor modern techniques (*CW, Oct. 16, '54, p. 98*)—sharp copy, case histories. Some may ask "What's this insect?" or "What's the best way to treat. . . ?"

The company's familiarity with farm problems, its ag-chemical research and its basic chemical position will be driven home (to build prestige). Ads and literature will dispel confusion and ignorance about farm chemical use. A big, red, block M logotype will highlight stop signs, labels and ads. Packaging will be

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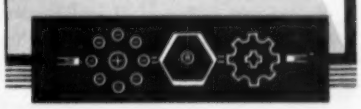

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P-7835 Chemical Week
330 W. 42 St., New York 36, N. Y.

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P-7783—Chemical Week
520 No. Michigan Ave., Chicago 11, Ill.

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P-7850 CHEMICAL WEEK
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chemical process industries

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practical—containers that farmers can reuse (e.g., 55-gal. drums with detachable lids, lidded 5-gal. pails). Material for farm youth—possibly comic books—is on the way. Later, Monsanto will give motivation research a whirl.

Publicity will aim at producing identification of and reputation for Monsanto as a farm chemical company. Prime target: editorial mention in rural media. All tools—releases, radio-TV kits, articles, radio-TV interviews, field demonstrations for the rural editor—will get heavy use.

Reputation-building articles on research, stories about company people, case histories, county fairs, and dealers will pop up in company magazine reprints. Salesmen will feed back ideas on feature story write-ups for rural papers (local demonstrations). Eventually there'll be prepared speeches and movies for the farm group meetings. And several store-window-size displays will be shipped about the territory. Both publicity and advertising will rely on what salesmen find needed in the field.

Whither the Formulator? By its move, Monsanto becomes, it thinks, the last major farm chemical producer to sell branded products. It's quite reasonable to expect some formulators will suffer, that Monsanto will lose some trade. But, where much land goes untreated (one estimate: over 80% for pesticides) and losses run to billions yearly, Monsanto reasons that there should certainly be room for one more firm. Against the costly research, marketing and promotion programs of big producers, the formulator can pit formulas tailored to local conditions, local production, detailed knowledge of the locale, and ability to combine the best products of all synthesizers. Too, promotional efforts of the giants are bound to help all. Hence, it figures that predictions of the early demise of formulators are premature, if valid at all. With improved marketing practices (some trade quarters feel formulators generally do a weak job), the local compounder should still find a healthy business feasible.

Monsanto will likely need at least two or three years to carve its niche. Lion Oil's fertilizer distribution setup (1,800 service stations in the South) will likely help matters considerably. Still, the salesman will be a focal point of farm chemical merchandising.

DISTRIBUTION

For Tomorrow's Reference: Organic chemical catalog — supplement contains additions to company line, price changes. Distillation Products Industries Division of Eastman Kodak Co. (Rochester, N. Y.).

• Fatty acids—4-p. folder gives specifications and characteristics of oleic, stearic, animal and vegetable, and hydrogenated fatty acids, plasticizers, acid esters, glycerides. Emery Industries, Inc. (Cincinnati).

• Heat transfer fluids—4-p. folder provides plots of viscosity vs. specific gravity, heat capacity and thermal conductivity, solubility characteristics, shipping data, and suggested uses. Carbide and Carbon Chemical Corp. (New York).

•

Packaging and Plastics: Every major plastics supplier will take part in a one-day technical symposium on "Plastics in Packaging" sponsored by the Society of Plastic Engineers at New York's Hotel Statler, Nov. 16. Speakers from 11 producers will probe plastic packaging techniques, its future, its trends. And to top things off, an evening session will feature a designer and a chain-store buyer viewing plastic packaging relative to marketing methods.

•

Packaging Progress: Polyethylene pops up in unusual places. Now it's serving as a protective coating for a jute fabric used in bags. The tough mechanical properties of jute and the chemical resistivity of polyethylene team up to make a waterproof, odorless, strong, and tear-resistant material suitable for chemical and food packaging. Manufacturer: De Swan Bonnist (Amsterdam, Holland).

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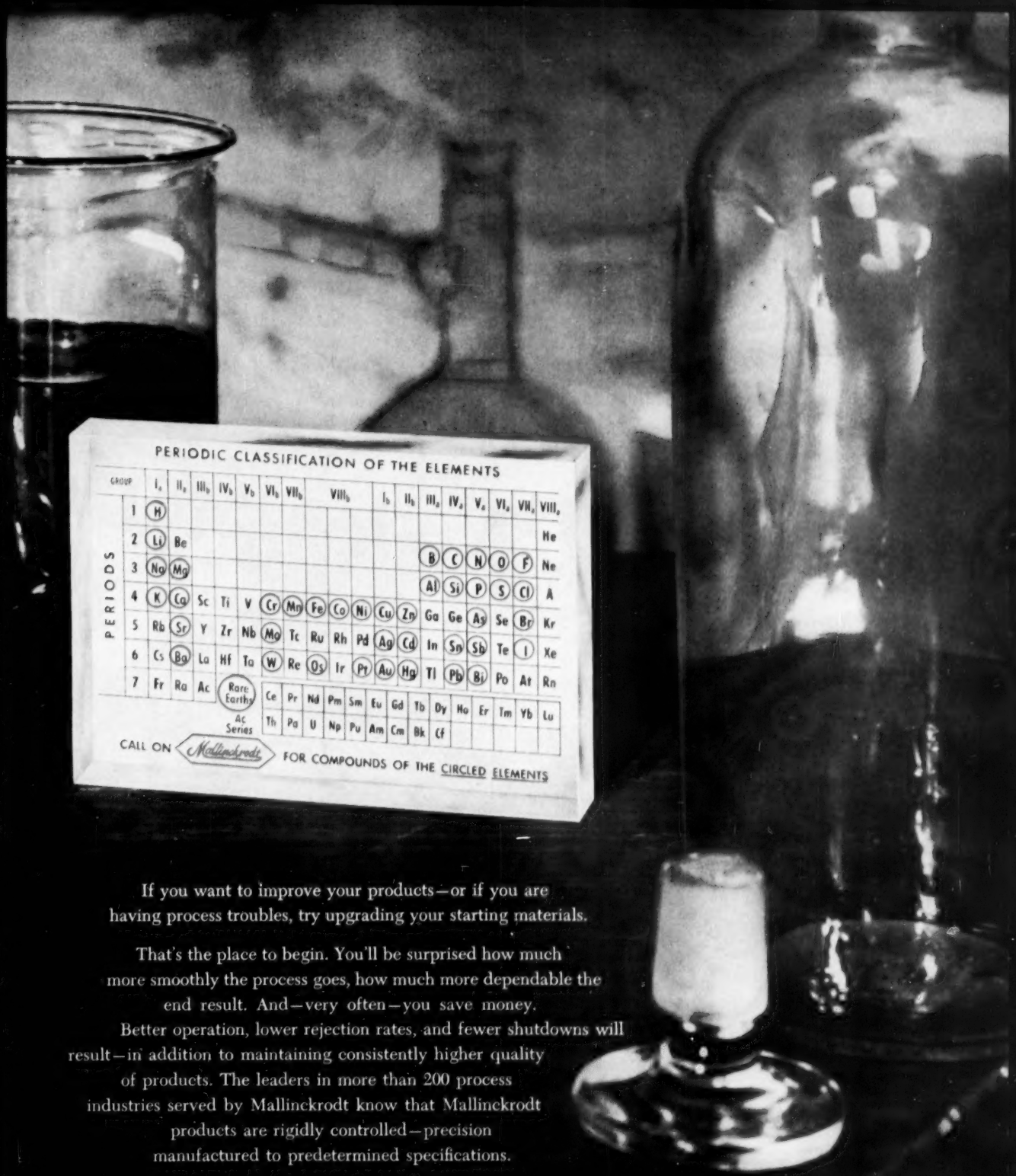

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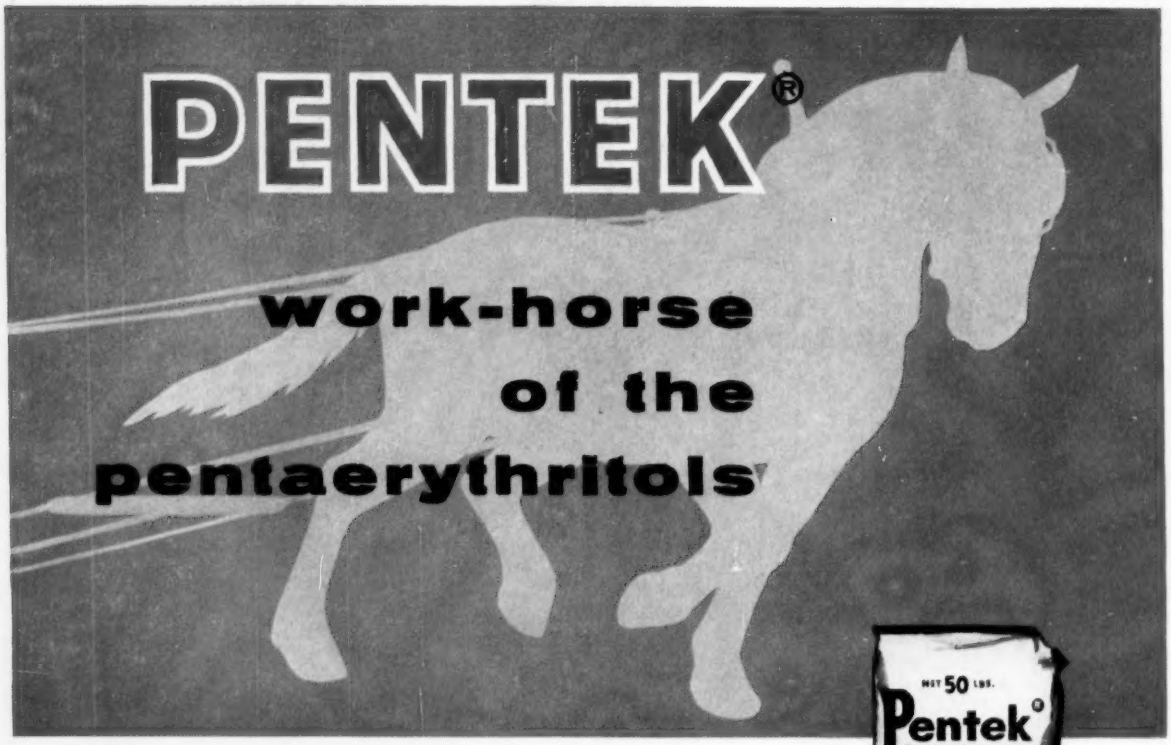

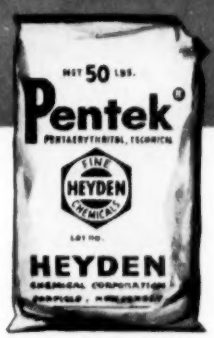

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